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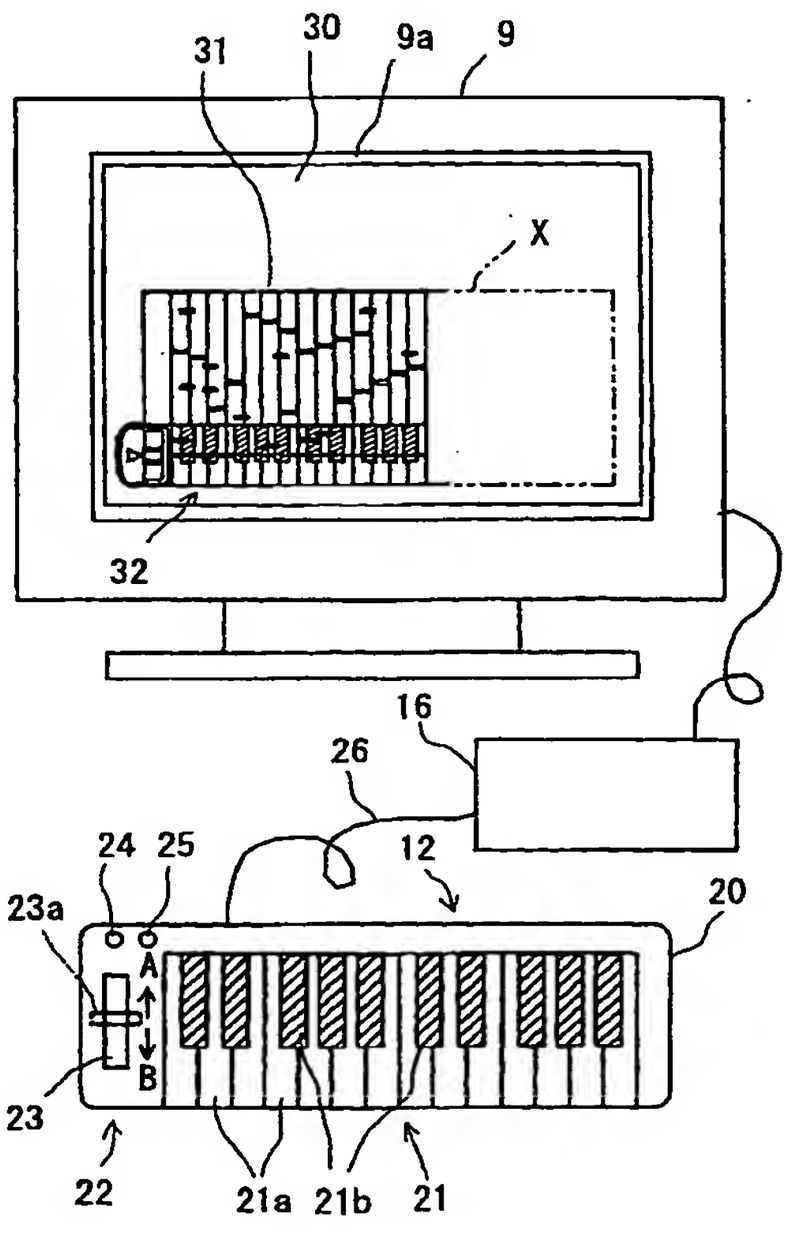
(54) Game system and storage medium to be used for the same

(57) There is provided a game system capable of solving or reducing feeling or wrongness to improve interest of a game such as music game. The game system comprises a storage device for storing a reference data defining timing of at least one operation to be performed by a player on an input device (12) in association with an elapsed time from a predetermined position as a reference in a game; an operation instruction device for instructing the player operation timing based on the reference data; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device (23) for changing the operation timing to be instructed by the operation instruction device based on the adjustment value with the predetermined position in the game being as a reference.

FIG.3



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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 5406

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 903 169 A (KONAMI CO LTD) 24 March 1999 (1999-03-24) * paragraph [0004] - paragraph [0005] * * paragraph [0009] - paragraph [0010] * * paragraph [0014] - paragraph [0017] * * paragraph [0023] - paragraph [0024] * * paragraph [0049] * * paragraph [0088] - paragraph [0091] *	1-18	G10H1/00
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A	US 5 511 053 A (JAE-CHANG JEONG) 23 April 1996 (1996-04-23) * column 1, line 53 - column 2, line 17 * * column 4, line 1 - line 19 * * column 4, line 61 - column 5, line 44; figures 1-3 *	1-6,9-15	
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

G10H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 October 2002	Pulluard, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 01 30 5406

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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17-10-2002

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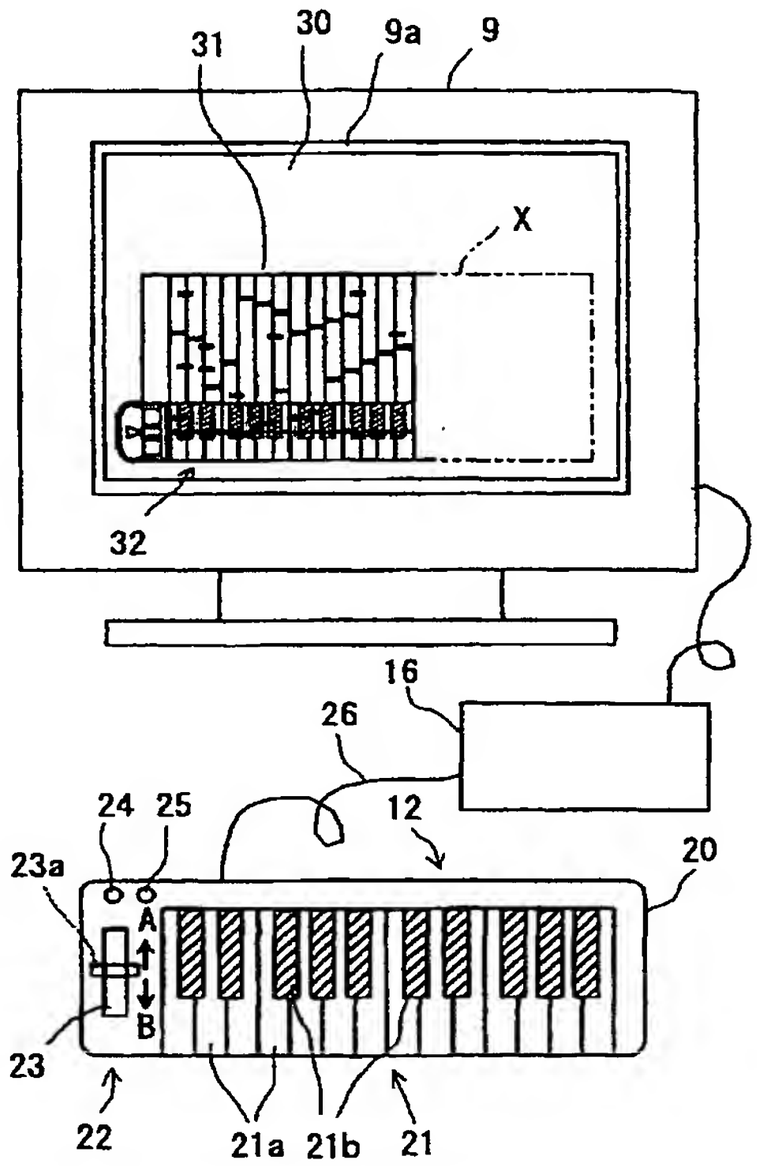
(54) Game system and storage medium to be used for the same

(57) There is provided a game system capable of solving or reducing feeling or wrongness to improve interest of a game such as music game. The game system comprises a storage device for storing a reference data defining timing of at least one operation to be performed by a player on an input device in association with an elapsed time from a predetermined position as a reference in a game; an operation instruction device for instructing the player operation timing based on the reference data; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for changing the operation timing to be instructed by the operation instruction device based on the adjustment value with the predetermined position in the game being as a reference.

FIG.3



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Description

[0001] The present invention relates to a game system using a computer and a storage medium to be used for such game system.

[0002] A number of game systems using a computer request some operation of a player, detect an operation actually done by the player in response to the request, evaluate the detected operation, and execute a process, for example, calculating a score, varying progress of the game or the like in accordance with an evaluation result. The evaluation of the operation can be done in accordance with various procedures. In one instance to evaluate operation, an deviation amount between timing of requesting the operation and timing when the player actually perform the operation in response to the request is detected, and the smaller the deviation amount, the higher the evaluation. As a typical instance in which such process is executed, there is provided a game system which randomly chooses one operation portion in a plurality of operation portions to which the player can operate to thereby instruct an operation thereon, detects how long the player's operation is delayed from the instruction, and increased the evaluation as the delayed time is shortened.

[0003] The evaluation of the operation based on the deviation of the timing is carried out in a music game directed to enjoy operation in time with music. In such game, timing of a series of operations to be done in time with the music reproduced as the BGM is defined in advance and information corresponding thereto is prepared as data. During a game play, the BGM is reproduced and, in connection with progress of the music, the player is instructed to perform operation in accordance with timing defined in the data. If the player performs the operation to follow the instruction, the game system compares the timing when each operation is done with the timing defined in advance, and the smaller the deviation amount therebetween, the higher the evaluation to the player's operation.

[0004] However, in a game system considering the operation timing as an element for the evaluation, there is a possibility that the player's feeling of reality does not match the evaluation in the game, thereby causing the player to have feeling of wrongness. For example, even if the player himself believes to perform the operation at a proper timing, the operation is evaluated low, or in the contrary case, the evaluation is high, even if the player feels to perform the operation at inadequate timing.

[0005] One of causes introducing such feeling of wrongness is existence of another system or device as the reference besides the game system. As the typical instance thereof, there is a case that game software is diverted from the arcade-type game machine to the household game machine and vice versa. Between the arcade-type game machine and the household game machine, the hardware configurations and the details of the programs are different from each other. Therefore, even if the contents of each game are seemed to be the same at a first sight, but there are many differences, that is, responsiveness of an input device (timing of detecting the operation), or the differences in the procedure of the process for evaluation the operation, and such differences cause the feeling of wrongness. In the case of the music game, the player having already get the higher evaluation in the game play on the arcade-type game machine sometimes fails to obtain the evaluation as he or she believes in the game play with the household game machine, even if the player chooses the same tune as that in the game play with the arcade-type game machine. The system or device to be as the reference is not limited to a game machine. For example, if in the case of providing an input device imitating an actual rifle or the like for a shooting game, there is a possibility that the relationship between an operation of a trigger and a timing when a bullet is actually shot is different from that in the actual rifle. In such case, if the person well versed in rifle shooting plays the game, that person may fail to obtain the result as he or she believes, resulting in looseness of the player's interest to the game. Further, even if the device does not exist, when the player exchanges the input device, there may be caused the same feeling of wrongness due to an individual difference or property of the input device with respect to responsiveness thereof.

[0006] It is, therefore, an object of the present invention to provide a game system capable of solving or reducing feeling or wrongness to improve interest of a game, and a storage medium suitable for being used in such system.

[0007] To achieve the above object, in the first aspect of the present invention, there is provided a game system comprising a storage device for storing a reference data defining timing of at least one operation to be performed by a player on an input device in association with an elapsed time from a predetermined position as a reference in a game; an operation instruction device for instructing the player operation timing based on the reference data; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for changing the operation timing to be instructed by the operation instruction device based on the adjustment value with the predetermined position in the game being as a reference.

[0008] According to the above game system, if the adjustment has been executed, the operation timing in-

structed by the operation instruction device shifts in accordance with the adjustment value from the original timing of the operation which is defined to suppose the predetermined position in the game as the reference. Therefore, if the player has feeling of wrongness with respect to the correspondence relationship between the operation and the evaluation thereto, it is possible to execute the adjustment setting operation to thereby enable the player to play at the timing suitable for him or herself.

[0009] In the second aspect of the present invention, there is provided a game system comprising: a storage device for storing a reference data defining timing of at least one operation to be performed by a player on an input device in association with an elapsed time from a predetermined position as a reference in a game; an operation instruction device for instructing the player operation timing based on the reference data; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for adjusting a deviation amount between the timing defined in the reference data and the actual timing detected by the operation detection device based on the adjustment value.

[0010] According to this game system, if the detected timing of the operation actually performed by the player shifts from the original timing of the operation which is defined so as to suppose the predetermined position in the game as the reference, the deviation amount can be adjusted in accordance with the adjustment value. Therefore, if the player has feeling of wrongness with respect to the correspondence relationship between the operation and the evaluation thereto, it is possible to execute the adjustment setting operation to thereby enable the player to obtain the evaluation as he or she believes without the player him or herself changing the timing of the operation.

[0011] In the third aspect of the present invention, there is provided a game system comprising: a storage device for storing a reference data defining timing of at least one operation to be performed by a player on an input device in association with an elapsed time from a predetermined position as a reference in a game; an operation instruction device for instructing the player operation timing based on the reference data; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for changing a relationship between a deviation amount of the actual timing detected by the operation detection device to the timing defined in the reference data and an evaluation result by the evaluation device based on the adjustment value.

[0012] According to this game system, if the detected timing of the operation actually performed by the player shifts from the original timing of the operation which is defined so as to suppose the predetermined position in the game as the reference, the relationship between the deviation amount and the evaluation can be adjusted in accordance with the adjustment value. Therefore, if the player has feeling of wrongness with respect to the correspondence relationship between the operation and the evaluation thereto, it is possible to execute the adjustment setting operation to thereby enable the player to obtain the evaluation as he or she believes without the player him or herself changing the timing of the operation.

[0013] In the fourth aspect of the present invention, there is provided a game system comprising: a tune reproduction device for reproducing a tune with a predetermined position in a game being as a reference; a storage device for storing a reference data defining timing of at least one operation to be performed by a player on an input device during a reproduction of the tune in association with a position in the tune to be reproduced in a game; an operation instruction device for instructing the player operation timing based on the reference data during the reproduction of the tune; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player during the reproduction of the tune; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for changing a deviation amount between the position in the tune and the operation timing to be instructed by the operation instruction device based on the adjustment value when the tune is reproduced.

[0014] According to this game system, if the adjustment has been executed, the operation timing instructed by the operation instruction device shifts in accordance with the adjustment value from the original timing of the operation which is defined to suppose the predeter-

mined position in the game as the reference. Therefore, if the player has feeling of wrongness with respect to the mutual relationship among the reproduction of the tune, the timing of instructing the operation and the evaluation to the operation, it is possible to execute the adjustment setting operation to thereby enable the player to play at the timing suitable for him or herself.

[0015] In the fifth aspect of the present invention, there is provided a game system comprising: a tune reproduction device for reproducing a tune with a predetermined position in a game being as a reference; a storage device for storing a reference data defining timing of at least one operation to be performed by a player on an input device during a reproduction of the tune in association with a position in the tune to be reproduced in a game; an operation instruction device for instructing the player operation timing based on the reference data during the reproduction of the tune; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player during the reproduction of the tune; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for adjusting a deviation amount between the timing of the operation defined in the reference date and the actual timing detected by the operation detection device based on the adjustment value.

[0016] According to this game system, if the detected timing of the operation actually performed by the player shifts from the original timing of the operation which is defined so as to suppose the predetermined position in the game as the reference, the deviation amount can be adjusted in accordance with the adjustment value. Therefore, if the player has feeling of wrongness with respect to the mutual relationship among the reproduction of the tune, the instruction of the operation and the evaluation to the operation, it is possible to execute the adjustment setting operation to thereby obtain the evaluation as he or she believes without the player him or herself changing the timing of the operation.

[0017] In the sixth aspect of the present invention, there is provided a game system comprising: a tune reproduction device for reproducing a tune with a predetermined position in a game being as a reference; a storage device for storing a reference data defining timing of at least one operation to be performed by a player on an input device during a reproduction of the tune in association with a position in the tune to be reproduced in a game; an operation instruction device for instructing the player operation timing based on the reference data during the reproduction of the tune; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player during the reproduction of the tune; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for changing a relationship between a deviation amount of the actual timing detected by the operation detection device to the timing defined in the reference data and an evaluation result by the evaluation device based on the adjustment value.

[0018] According to this game system, if the detected timing of the operation actually performed by the player shifts from the original timing of the operation which is defined so as to suppose the predetermined position in the game as the reference, the relationship between the deviation amount and the evaluation can be adjusted in accordance with the adjustment value. Therefore, if the player has feeling of wrongness with respect to the mutual relationship among the reproduction of the tune, the instruction of the operation and the evaluation to the operation, it is possible to execute the adjustment setting operation to thereby obtain the evaluation as he or she believes without the player him or herself changing the timing of the operation.

[0019] The present invention can be embodied in a computer readable storage medium as described below.

[0020] In the seventh aspect of the present invention, there is provided a computer readable storage medium storing a program which causes a computer provided in a game system to serve as: an operation instruction device for instructing a player operation timing based on a reference data which defines timing of at least one operation to be performed by the player on an input device in association with an elapsed time from a predetermined position as a reference in a game; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for changing the operation timing to be instructed by the operation instruction device based on the adjustment value with the predetermined position in the game being as a reference.

[0021] In the eighth aspect of the present invention, there is provided a computer readable storage medium storing a program which causes a computer provided in a game system to serve as: an operation instruction device for instructing a player operation timing based on a reference data which defines timing of at least one operation to be performed by the player on an input device in association with an elapsed time from a predetermined position as a reference in a game; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for adjusting a deviation amount between the timing defined in the reference data and the actual timing detected by the operation detection device based on the adjustment value.

[0022] In the ninth aspect of the present invention, there is provided a computer readable storage medium storing a program which causes a computer provided in a game system to serve as: an operation instruction device for instructing a player operation timing based on a reference data which defines timing of at least one operation to be performed by the player on an input device in association with an elapsed time from a predetermined position as a reference in a game; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for changing a relationship between a deviation amount of the actual timing detected by the operation detection device to the timing defined in the reference data and an evaluation result by the evaluation device based on the adjustment value.

[0023] In the tenth aspect of the present invention, there is provided a computer readable storage medium storing a program which causes a computer provided in a game system to serve as: a tune reproduction device for reproducing a tune with a predetermined position in a game being as a reference; an operation instruction device for instructing a player operation timing during the reproduction of the tune based on a reference data which defines timing of at least one operation to be performed by the player on an input device during a reproduction of the tune in association with a position in the tune to be reproduced in the game; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player during the reproduction of the tune; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for changing a deviation amount between the position in the tune and the operation timing to be instructed by the operation instruction device based on the adjustment value when the tune is reproduced.

[0024] In the eleventh aspect of the present invention, there is provided a computer readable storage medium storing a program which causes a computer provided in a game system to serve as: a tune reproduction device for reproducing a tune with a predetermined position in a game being as a reference; an operation instruction device for instructing a player operation timing during the reproduction of the tune based on a reference data which defines timing of at least one operation to be performed by the player on an input device during a reproduction of the tune in association with a position in the tune to be reproduced in the game; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player during the reproduction of the tune; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for adjusting a deviation amount between the timing of the operation defined in the reference date and the actual timing detected by the operation detection device based on the adjustment value.

[0025] In the twelfth aspect of the present invention, there is provided a computer readable storage medium storing a program which causes a computer provided in a game system to serve as: a tune reproduction device for reproducing a tune with a predetermined position in a game being as a reference; an operation instruction device for instructing a player operation timing during the reproduction of the tune based on a reference data which defines timing of at least one operation to be performed by the player on an input device during a reproduction of the tune in association with a position in the

tune to be reproduced in the game; an operation instruction device for instructing the player operation timing based on the reference data during the reproduction of the tune; an operation detection device for detecting actual timing of an actual operation performed on the input device by the player during the reproduction of the tune; an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other; an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and an adjustment execution device for changing a relationship between a deviation amount of the actual timing detected by the operation detection device to the timing defined in the reference data and an evaluation result by the evaluation device based on the adjustment value.

[0026] In the above aspects of the present invention, said adjusting value setting device may change the adjustment value based on an amount of an operation by the player to a specific operation portion in the input device. The adjusting value setting device may cause the operation instruction device to instruct an operation at predetermined timing with said predetermined position being as a reference, and may set the adjusting value based on *a* deviation amount between said instructed timing of the operation and an actual timing detected by the operation detection device in response to that instruction.

[0027] In the fourth and twelfth aspects of the present invention, there may be defined, in the reference data, timing of a series of operations to be performed on the input device by the player during the reproduction of the tune, the operation instruction device may cause a display device to display on a screen thereof instruction signs which correspond to said series of the operations, respectively, and a predetermined reference sign, and may also move at least one of each instruction sign and the reference sign in a predetermined direction on the screen at a speed corresponding to a tempo of the tune to thereby instruct the player respective timing of said series of the operations through a coincidence of said each instruction sign and the reference sing, and the adjustment execution device may change, based on the adjustment value, the timing when said each instruction sign and the reference sign coincide with each other with said predetermined position being as the reference.

[0028] In the present invention, if the timing of the operation is defined in the reference data so as to be associated with the elapsed time from the predetermined position in the game, the timing can be represented by the elapsed time itself or a parameter associated with the elapsed time. If the timing of the operation is defined in the reference data so as to be associated with the position in the tune, the timing can be represented by the elapsed time itself from the proper position (for example, the reproduction start position) in the tune or a parameter associated with the elapsed time.

[0029] The timing of detecting the operation may be specified based on the elapsed time from the predetermined position, or may be specified based on en elapsed time from another position. In the former case, the timing of the operation defined in the reference data and the operation detected timing are compared with each other with the same position being as the reference. If there is delay in the response from when the operation is actually performed till the operation is actually detected, it may be possible to perform the evaluation with talking the delay into account. By doing such process, it is possible to determine the deviation of the timing more exactly. In the game system directed to play the music game, there is possibility that the player feels the deviation in comparison with the reproduction of the tune, even through the player does not feel wrongness with respect to the relationship between the timing instructed to the player and the result of the evaluation. According to the fourth and tenth aspects of the present invention, it is possible to change, in connection with the adjustment of the timing of instructing the operation, the position considered as the reference for the timing of detecting the operation from the predetermined position which is referred to as the reference in the reproduction of the tune, so that the player can adjust the deviation between the reproduction of the tune and the timing to be instructed with fixing the relationship between the operation and the evaluation in the proper state.

[0030] In the present invention, the storage medium includes various storage device or means such as magnetic storage medium, optical storage medium, magneto-optical storage medium, semi-conductor storage device or the like.

[0031] In the accompanying drawings:

FIG. 1 is a functional block diagram of a household game machine provided as one embodiment of the present invention;

FIG. 2 is a schematic diagram showing a program and data recorded on a CD-ROM as a storage medium;

FIG. 3 is a diagram showing a state in which a controller and a monitor are connected to a game main body in FIG. 1;

FIG. 4 is a diagram showing an operation instruction picture to be displayed in a game picture of FIG. 3;

FIG. 5 is a diagram showing a relationship between timing of starting reproduction of a tune and timing of starting a scroll process to be executed for performing operation guidance;

FIG. 6 is a diagram showing a way of operation evaluation by the game machine of FIG. 1;

FIG. 7 is a diagram showing a positional deviation of an object when varying start time of the scroll process;

FIG. 8 is a flowchart showing a procedure to be executed for setting an adjustment value;
FIG. 9 is a view showing a picture to be displayed on a screen of a monitor when the process of FIG. 8 is executed;
FIG. 10 is a view showing a display example when an "ADJUST" is selected in a picture of FIG. 9;
FIG. 11 is a view showing a display example of FIG. 9 when entering a manual setting mode in accordance with the process of FIG. 8;
FIG. 12 is a view showing a display example of FIG. 9 when entering an automatic setting mode in accordance with the process of FIG. 8;
FIG. 13 is a flowchart showing a procedure to be executed when a test play is performed;
FIG. 14 is a flowchart showing a procedure of a play start process to be executed as a sub-routine depending on processes of FIGS. 13 and 16;
FIG. 15 is a view showing a display example of a picture to be displayed when in the test play;
FIG. 16 is a flowchart showing a procedure to be executed when actually performing a game; and;
FIG. 17 is a flowchart showing a procedure to be executed instead of Steps S7 to S10 in FIG. 16 when adjusting operation detection timing as indicated in FIG. 6(b).

[0032] Now, an embodiment in which a present invention is applied to a household game machine will be described with reference to FIGS. 1 to 5. FIG. 1 is a functional block diagram as an example of a household game machine. This household game machine performs a predetermined game in accordance with a game program stored in a CD-ROM 15 as a storage medium. The game machine comprises a CPU 1 using a microprocessor, a ROM2 and RAM 3 as a main storage device to the CPU 1, a graphics processing unit (GPU) 4 for graphics processing and a sound processing unit (SPU) 6 for sound processing, buffers 5 and 7 for respective units, and a CD-ROM reader 8. The ROM 2 stores an operating system as a program necessary for entire operation control of a game machine. The RAM 3 stores, on demand, a game program or data read out from the CD-ROM 15 as a storage medium. The GPU 4 receives image data from the CPU 1, renders a game picture on the buffer 5, converts the image data into predetermined video reproduction signals, and outputs those signals to a monitor 9. The SPU6 reproduces data of voice, musical sound or the like, data of sound sources and the like which are read out from the CD-ROM 15 and stored in the sound buffer 7, and outputs them from a loudspeaker 10. The CD-ROM reader 8 reads out the program and data recorded on the CD-ROM 15 in accordance with an instruction from the CPU 1, and outputs signals corresponding to the readout contents. On the CD-ROM 15 are stored the program and data necessary for execution of the game. A household. television set is used as the monitor 9, and a built-in loudspeaker thereof is used as the loudspeaker 10.

[0033] Further, a communication control device 11 is connected via a bus 14 to the CPU 1, and a controller 12 and an auxiliary storage device 13 are detachably connected to the device 11. The controller 12 serves as an input device, and is provided with operation portions to accept operation of a player. The communication control device 11 receives operation signals issued from the controller 12, and outputs signals corresponding to the received signals to the CPU 1. The CPU 1 determines the operation state of the controller 12 based on those signals. A plurality of controllers 12 and auxiliary storage devices 13 can be connected to the communication control device 11 in parallel.

[0034] In the above-described structure, elements except the monitor 9, the loudspeaker 10, the controller 12, the CD-ROM 15 and the auxiliary storage device 13 are integrally housed in a predetermined housing to thereby constitute a game machine main body 16. The game machine main body 16 serves as a computer.

[0035] On the CD-ROM 15, there are recorded a game program and a group of data necessary for execution of the game program. The game to be performed in accordance with the game program on the CD-ROM 15 is the so-called music game in which a music as a BGM is reproduced from the loudspeaker 10, while operation on the controller 12 to be performed in time to the BGM is visually instructed to a player through the monitor 9, and proper sound of a musical instrument or the like is mixed with the BGM if the player operates the controller 12 in accordance with the instruction, thereby allowing the player to experience feeling of performing the musical instrument. To enable the execution of such game, as schematically shown in FIG. 2, there are recorded a group of BGM data and a group of performance sequence data together with the game program.

[0036] The group of BGM data is a set of waveform data for each tune (tune 1, tune 2,...) to be reproduced as the BGM from the loudspeaker 10 through the SPU 6. The waveform data for each tune may be recorded in various formats. For example, it can be recoded in the CD-DA format. The group of performance sequence data is a set of performance sequence data prepared to be associated with each tune as the BGM. In short, the performance sequence data is data defining a procedure of operation for each operation portion on the controller 12 in time with the BGM, and corresponds to reference data. In detail, the performance sequence data is data defining which timing each operation portion is to be operated during the reproduction of the tune selected as the BGM. The timing in the tune can be represented by, for example, an elapsed time from a predetermined reference position in the tune, or any parameter corresponding to the elapsed time. The reference position can be set at any position after the play start of the game. For example, a position assumed as a reproduction start position of the tune as the BGM can be determined as the reference position, or any position after

the reproduction start, for example a position at which an overture is ended can be determined as the reference position. A total number of beats from the reference position, when dividing each measure constituting the tune into a predetermined number of beats (for example 32 beats), can be used as the parameter corresponding to the elapsed time.

[0037] Various data except the above data are recorded on the CD-ROM 15. For example, if it is allowed to generate sound effect in response to operation of a player, data designating which sound effect should be generated corresponding to each operation is recorded. The data may designate the sound effect for each operation portion on the controller 12 for every adequate end in the tune, or designate sound effect individually for each operation defined in the performance sequence data. Then, when in the case of generating the sound effect, waveform data to reproduce the sound effect from the loudspeaker 10 though the SPU 10 are recorded on the CD-ROM 15. Such data can be prepared, for example, as PCM data encoded at the same sampling frequency as that of the data for reproducing the BGM.

[0038] FIG. 3 shows a state in which the controller 12 and the monitor 9 are connected to the game machine main body 16. The controller 12 is an exclusive controller designed for the above described music game, and in this embodiment configured to imitate a keyboard instrument. Of course, the controller 12 is not limited to one imitating the keyboard instrument, but it can imitate various musical instruments (for example, a drum set, a guitar or the like). The controller may imitate an input device besides the musical instrument, and a game pad that is generally used in the household game machine may be used as the controller 12. The controller 12 may detect stepping motions by foot, or non-contact type detection device utilizing the infrared ray or the like can be used as the controller 12.

[0039] The controller 12 shown in FIG. 3 comprises a housing 20, for example made of resin, and the housing 20 is provided with a keyboard portion 21, a wheel portion 22, and push button switches 24 and 25. A true keyboard instrument is diverted to the keyboard portion 21, and the portion 21 has fourteen white keys 21a ... 21a and ten black keys 21b ... 21b corresponding to two octaves. These are capable of being depressed like those of the musical instruments. For example, it is possible to use a MIDI keyboard as the keyboard portion 21, and the CPU 1 can distinguish operation of each key using the MIDI signals output therefrom.

[0040] The wheel portion 22 comprises a wheel 23 rotatably operable about a rotation shaft 23a extending in a right-and-left direction in FIG. 3. The rotation shaft 23a is arranged in the housing 20, so that at least lower half of the wheel 23 is accommodated in the housing 20. A player (operator) can rotatably operate the wheel 23 in a front-and-rear direction (directions indicated by arrows A and B in FIG. 3) with putting a finger on an upper surface thereof. The white keys 21a, the black keys 21b and the wheel 23 are provided as operation portions used in a game play. Also, the push button switches 24 and 25 are provided as operation portions through which a start, an interruption or the like is instructed. The controller 12 transmits signals associated with operation states of these white keys 21a, black keys 21b, wheel 23 and push button switches 24 and 24 through a signal conductor 26 to the game machine main body 16. With respect to the white keys 21a and black keys 21b, signals indicating a key stroke and a key release are output, while signals indicating a rotation amount and a rotation direction are output with respect to the wheel 23.

[0041] During a game play to be executed in accordance with the game program recorded on the CD-ROM 15, a game picture 30 is displayed on a screen 9a of the monitor 9. In the game picture 30, there is included an operation instruction picture 31 for instructing operation of the controller 12. As shown in phantom line X in FIG. 3, the width of the operation instruction picture 31 can be adjusted in the right-and-left direction. The view of the operation instruction picture 31 is shown in FIG. 4.

[0042] As is apparent from FIG. 4, in a lower portion of the operation instruction picture 31, there is provided a controller picture 32 having a correspondence relationship to the controller 12 as an input device. The controller picture 32 includes a keyboard picture 33 corresponding to the keyboard portion 21 of the controller 12 and a wheel picture 34 corresponding to the wheel portion 22. The keyboard picture 33 includes virtual white keys 33a and black keys 33b corresponding to the white keys 21a and black keys 21b of the actual keyboard potion 21, respectively. Also, the wheel picture 34 includes a virtual wheel 35 corresponding to the actual wheel 23. With respect to a correspondence relationship between these pictures and the respective portions of the actual keyboard portion 21 in external views thereof, it is not necessary to keep complete sameness therebetween, and it is acceptable to keep the sameness in a level that a player can grasp a correspondence relationship between the operation portions of the controller 12 and the operation portions in the controller picture 32 at a first sight. For example, it may possible to allow the player to distinguish the correspondence relationship between the controller 12 and the controller picture 32 by providing sameness with respect to a configuration or color of each operation portion, or providing sameness with respect to a letter or a mark attached to each operation portion.

[0043] In the controller picture 32, there is displayed a reference line 36 traversing the keyboard picture 33 in its right-and-left direction (key arrangement direction), and a reference mark 37 is displayed beside the wheel picture 34 with its position being coincided with the reference line 36 in a vertical direction. These reference line 36 and the reference mark 37 serve as reference signs for indicating an operation time of the controller 12.

[0044] Above the keyboard picture 33, there are dis-

played partition lines 40 ... 40 extending in the vertical direction to accord with boundary positions of the white keys 33a. By these partition lines 40, there are provided areas 41 ... 41 of the same numbers as those of the white keys 33a above the keyboard picture 33 in the operation instruction picture 31. Also, above the wheel picture 35, there are displayed partition lines 42 to thereby provide an area 43. Accordingly, the areas 41 ... 41 correspond to the actual white keys 21a ... 21a with a one-to-one relationship through the virtual white keys 33a ... 33a, while the area 43 corresponds to the actual wheel 23 through the virtual wheel 35. Further, the partition lines 40 ... 40 correspond to the virtual black keys 33b ... 33b with a one-to-one relationship.

[0045] In each area 41, there are displayed objects 45 ... 45 as movable signs, which are flat in the right-and-left direction, and on the partition lines 40 (but only on lines overlapping the black keys) are displayed the similar objects 46. The similar object is displayed in the area 43, but its illustration is omitted in FIG. 4. Each of the objects 45 and 46 appears in the upper end of the operation instruction picture 31, and goes down at a speed in compliance with a tempo of the tune as the BGM. Then, through the coincidence of the object 45 or 46 and the reference line 36, the player is informed of operation timing of the white key 21a or the black key 21b as the operation portion corresponding to the area 41 or the partition line 40, in or on which each of the objects 45 and 46 are displayed. Namely, the player is requested to operate the white key 21a or the black key 21b associated with the display position of the object 45 or 46 (the area 41 or the partition line 40) a the time that the object 45 or 46 coincides with the reference line 36.

[0046] As is discussed in the above, the operation timing is defined by the performance sequence data. Accordingly, the above described display of the objects 45 and 46 can be carried out by executing the so-called scroll process, in which the steps of reading out the performance sequence data with shifting the readout range from the head of the data by a predetermined amount at certain intervals while determining a predetermined time in the. game as a starting point, and of calculating coordinates of the objects 45 and 46 to be displayed in the picture 31 based on the read performance sequence data are repeated.

[0047] In the above described scroll process, the display positions of the each of the objects 45 and 46 are basically controlled so as to coincide the operation timing of each operation portion defined in the performance sequence data with the operation timing guided through the coincidence of the object 45 or 46 and the reference line 36. However, if an adjustment value is set through an adjustment value setting process which will be described later, a deviation according to the adjustment value is set between the operation timing guided through the coincidence of the object 45 or 46 and the reference line 36 and the operation timing defined in the performance sequence data. Hereinafter, this point will be explained with referring to FIG.5.

[0048] FIG. 5 is a diagram showing a time relationship between the reproduction of the BGM and the scroll process for the objects. There is a time lag from the time when the CPU 1 of the game machine instructs to start the reproduction of the BGM till the BGM is actually reproduced through the loudspeaker 10. In FIG. 5 (a), there is assumed that the time when the BGM is actually reproduced is considered as a reference time T0, and that the CPU 1 instructs the reproduction of the BGM at the time T1 obtained by going back to the past from the time T0 by an interval corresponding to the time lag necessary for executing the reproduction of the BGM. With respect to the scroll process, there is also a time lag from the time when the CPU 1 starts the process till the scrolling display is actually started in the picture 31. In general, the time lag with respect to the scroll process does not accord to the time lag with respect to the reproduction of the BGM.

[0049] As described in the above, the performance sequence data is originally prepared to define what operation should be done at which position in the tune, and the evaluation of the player's operation is carried out based on the performance sequence data. Therefore, the scroll of the objects should be exactly synchronized to the BGM. For example, in the case where the reproduction start time of the BGM is set as the reference position and the operation timing is defined by the elapsed time from the reference position or the parameter corresponding to the elapsed time in the performance sequence data, if the time when the scrolling display is started does not accord to the production start time T0 of the BGM, the timing instructed to the player through the scrolling display is deviated from the position in the tune defined in the performance sequence data as the operation timing, so that the exact timing can not be instructed to the player.

[0050] Therefore, as shown in FIG. 5(b), it is necessary to determine the time T2 of starting the scroll process in such a manner that the time when the scrolling display is started coincides with the reproduction start time T0 of the BGM. However, it is difficult to perfectly accord the timings with each other. Therefore, in the step of developing the software, the BGM is considered as a reference, and the timing to instruct the start of the reproduction of the BGM and the timing of starting the scrolling display are adjusted so as to obtain feeling that the operation is instructed at the most suitable timing. Accordingly, the timing when the reproduction of the BGM is started and the timing when the scrolling display is started are not always accord with each other. However, it is herein assumed that both of the reproduction of the BGM and the scrolling display are started at the entirely same time T0 when in a standard setting.

[0051] Incidentally, it is not necessary to always coincide the time of starting the scrolling display with the reproduction start time of the BGM. It may be acceptable to start the scrolling display at the predetermined posi-

tion in the BGM (for example, end position of an overture part). However, it is herein supposed that the reproduction start time is considered as the reference time TO and the scrolling display is started at that time for the sake of convenience.

[0052] On the other hand, in the game program, there is prepared an evaluation process in which operation of the player is evaluated based on the performance sequence data, besides the above described scroll process. That process is executed as shown in FIG. 6(a).

[0053] Hereinafter, it is supposed one example in which the time Tr after a predetermined seconds from the above described reference time T0 is defined in the performance sequence data as an operation time for any operation portion (for example, the white key 21a on the right end), and the operation is instructed to the player in such a manner that the object 45 corresponding to the right end white key 21a reaches the reference line 36 at the time Tr through the above described scroll process (however, the adjustment values is not set). Further in the example, it is supposed that the player operates the right end white key 21a in response to the instruction of the operation timing, and that operation is detected at time Td.

[0054] In the evaluation program, there is set some evaluation ranges before and after the operation time Tr. For example in the case of FIG. 6(a), one range having a center on the position of the operation time Tr is set as a range giving the evaluation of "GREAT", and outward therefrom are set ranges giving the evaluation of "GOOD", and further outward therefrom are set ranges giving the evaluation of "BAD", and still further outside therefrom are set ranges giving the evaluation of "POOR", respectively. When the operation with respect to the right end white key 21a is detected, the CPU 1 determines which one of the above described ranges the detected timing Td is included in, and giving points associated with the range including the detected timing Td. At this time, the points are decreased as the timing Td deviates from the timing Tr. Namely, the evaluation is lowered as the timing Td when the operation is actually detected deviates from the operation timing Tr defined in the performance sequence data. Incidentally, in the case where the player operates the white key 21a, the black key 21b, or the wheel 23, there is a time lag from the time when the operation is actually performed till the CPU 1 actually detects the operation. Accordingly, when in the case to determine the deviation amount between the operation timing Tr on the performance sequence data and the detected timing Td, it is necessary to consider the time lag of the detection. However, it is herein assumed that the time lag is not occurred, or the detected timing Td itself indicates the time having been corrected with taking the time lag into account.

[0055] As described in the above, the reproduction of the BGM, the operation instruction based on the performance sequence data and the operation evaluation based on the same data are associated with each other. However, the mutual relationship among these can be affected by various elements, so that a subtlety deviation may be occurred among them. If such deviation is occurred, there is a possibility that the timing of instructing the operation to the player deviates from the original position in the BGM, or the evaluation is lowered even though the player performs the operation so as to exactly follow the instruction of the operation, thereby causing feeling of wrongness. Also, even though the above mutual relationship is properly adjusted in the household game machine itself, there may be provided another game machine (for example, an arcade-type game machine) having a hardware configuration different from that of the household game machine, while the contents of the game is the same as those executed on the household game machine. In such case, the above mutual relationship in the arcade-type game machine may be differed from that of the household game machine, so that the player skilled in the play on the arcade-type game machine can not obtain higher evaluation when playing the same tune on the household game machine, thereby also causing feeling of wrongness.

[0056] Further, in the case where the responsiveness of the controller 12 is inferior to an input device of the arcade-type game machine, that is, the timing of issuing the detection signals in response to the operation on the white key 21a or the black key 21b may be slow in comparison with that of the arcade-type game machine, there may be caused the same problem. In such case, if the player skilled in the play on the arcade-type game machine plays the game on the household game machine, the operation by the player is detected by the game machine at the time later than the time when the player feels that the operation is detected, even if the timing of instructing the operation in the household game machine has properly been adjusted by the designer of the software so as to be matched with the timing in the arcade-type game machine. Therefore, the evaluation is deviated, even if the player believes to have exactly followed the operation instruction given from the game machine.

[0057] Therefore, in the game system of this embodiment, the player is allowed to adjust the timing of starting the scroll process, thereby enabling adjustment of the timing when the objects 45 and 46 coincide with the reference line 36 in the game picture. FIG. 5 (c) shows an example in which the timing of starting the scroll process is delayed, and FIG. 5 (d) shows an example in which the timing of starting the scroll process is advanced, respectively. In such case of varying the timing of starting the scroll process, the display positions of the objects 45 and 46 are shifted to upper or lower side from the positions when in the standard state. Namely, as shown in FIG. 7, in the case where the object 45 (or 46) coincides with the reference line 36 at the time Tr after the predetermined seconds from the reference time T2 when in the standard state, the object 45 deviates upward the reference line 36 at the time Tr if the timing of

starting the scroll process is delayed, while the object 45 deviates downward from the reference line 36 at the time Tr if the timing of starting the scroll process is advanced. Thus, it is possible to adjust the timing of the operation to be instructed to the player based on the performance sequence data.

[0058] Incidentally, it is necessary to take notice that the scroll process and the operation evaluation process are performed in accordance with the different reference times, respectively, when varying the start time of the scroll process as shown in FIG. 5. That is, in the scroll process, it is supposed that the time T0a (or T0b) having been corrected is considered as the reproduction start time of the BGM, the elapsed time or the parameter corresponding thereto is counted up with the corrected time being as the reference, and the display positions of the objects 45 and 46 are successively updated in accordance with the counted value from the corrected time T0a or T0b On the contrary thereto, in the process for evaluating the operation, the elapsed time from the start of the reproduction of the BGM or the parameter corresponding to the elapsed time is counted up with the reference time T0, which is originally intended to be the reproduction start time of the BGM, being as the reference point, regardless of the deviation of the time when the scroll process is started. And the operation timing on the performance sequence data and the timing when the operation is actually performed are specified in accordance with the counted value from the time T0.

[0059] As described in the above, by shifting the display positions of the objects 45 and 46 upward or downward through the adjustment of the star time of the scroll process, there is generated a deviation in the mutual relationship among the reproduction of the BGM, the operation instruction based on the performance sequence data and the operation evaluation based on the same data. Therefore, when the player has feeling of wrongness to that relationship, it is possible to adjust the relationship to the state seemed to be the most suitable for the player him or herself. For example, if the player has feeling that the operation timing instructed by the coincidence of the objects 45 and 46 and the reference line 36 is advanced in comparison with the experience of playing the same tune by the arcade-type game machine, such player can solve or reduce the feeling of wrongness by adjusting the start time of the scroll process so as to be delayed from the standard time.

[0060] FIG. 8 is a flowchart showing the timing adjusting process to be executed by the CPU 1 for setting the adjustment value described in the above, and FIGS. 9 to 12 are examples of pictures displayed on the monitor 9 during that process. FIG. 9 shows the timing adjustment picture 100 displayed on the monitor 9. In the game described hereinafter, there is prepared an optional setting as one item in a main menu to be displayed in the start of the game or the like, and a timing adjustment process is prepared as a sub-item in the optional setting. When the player selects the timing adjustment process by operating the controller 12 and subsequently performs a determination operation, the picture 100 is displayed. In the timing adjustment picture 100, a part of the operation instruction picture 31 is displayed to be highlighted, and there are included a choice item display position 101, an instruction display portion 102 and an adjustment value display portion 103. The process shown in FIG. 8 is started when the player chooses the item of "ADJUST" in the choice item display portion 101 in the picture 100 and performs the determination operation.

[0061] In the process of FIG. 8, at the first Step S101, a choice menu is displayed in the operation instruction portion 102. In the choice menu, there are included choice items of "REAL TIME" which means an automatic setting of the adjustment value, and "MANUAL" which means a manual setting of the adjustment value. At step S102, it is judged whether or not the player chooses the item of "MANUAL", and if an affirmative judgment is done, then it is considered that the manual setting is chosen, so that the process is advanced to step S103, thereby entering a manual setting mode and a display of the picture 100 being changed as shown in FIG. 11.

[0062] After entering the manual setting mode, first of all, it is judged whether or not a predetermined setting operation is performed on the controller 12 (step S104). The setting operation can be defined properly, but in this case, rotational operation of the wheel 23 is defined as the setting operation. The adjustment value increases when the wheel 23 is rotated in one direction (for example, the direction indicated by an arrow A in FIG. 3), while decreases when the wheel 23 is rotated in a counter direction (for example, the direction indicated by an arrow B in FIG. 3. When the adjustment value is not set (this means the standard state in FIG. 5(b)), the value is considered as 0. When the adjustment values is a positive number, the timing of starting the scroll process is advance, while the timing of starting the scroll process is delayed when the adjustment values is a negative number. The current value of the adjustment value is displayed numerically in the adjustment value display portion 103. The adjustment value increases or decreases one by one as the wheel 23 is rotated by a predetermined unit amount. The minimum unit for adjusting the timing is, for example set to 1/75 seconds, and the increase or decrease of the adjustment value by one unit means that the start timing of the scroll process is shifted by the minimum unit. There are defined an upper limit and lower limit for the adjustment value, for example, +10 is set as the upper limit while -10 is set as the lower limit. The reason why defining such limits is that, if the display positions of the objects 45 and 46 are excessively deviated, there would be a problem that the deviation between the timing when the objects 45 and 46 coincide with the reference line 36 and the musical beats of the BGM becomes remarkable to thereby cause unnatural feeling.

[0063] At subsequent step S105, it is judged whether

or not the adjustment value reaches the upper or lower limit, and if it does not reach, then the adjustment value is changed in accordance with the adjustment value setting operation (step S106). If it reaches the upper or lower limit, the warning is performed to the player (step S107). It may be acceptable to merely ignore the adjustment value setting operation instead of setting the warning. At step S108 following those steps, it is judged whether or not the player performs a termination operation for the manual setting mode, and if a negative judgment is made, the process returns to step S104. If an affirmative judgment is made at step S108, then it is judged whether or not the player performs a termination operation for the timing adjustment (step S109). If a negative judgment is made, then the process returns to step S101, while the process of FIG. 8 is terminated when an affirmative judgment is made at step S110.

[0064] If a negative judgment is made at step S102, the process advances to step S120, and it is judged whether or not the item of "REAL TIME" is chosen. If an affirmative judgment is made, it is considered that the automatic setting is chosen and then the process advances to step S121, entering the automatic setting mode with the display of the picture 31 being changed as shown in FIG. 12. After entering the automatic setting mode, first of all, clocking is started to grasp the amount of deviation of the operation timing (step S122), and then reproduction of metronome sound is started at a predetermined beat number (step S123), and further a process to scroll one object 45 from the top end to the low end of the operation instruction picture 31 at a speed synchronized with the metronome sound (step S124). Next, operation is detected with respect to the white key 21a corresponding to the area in which the object 45 is displayed (step S125). Next, the adjustment value is determined based on the elapsed time from the start of clocking till the operation is detected (step S126). The adjustment value can be determined, for example, by the steps of: supposing that the operation is performed at the most suitable timing when the object 45 coincides with the reference line 36, determining the elapsed time Tx from the start of clocking at step S122 till the most suitable operation is detected as a standard value at the software designer's side, and detecting at step S126 the elapsed time Tx' from the start of clocking till the operation is actually detected. After the above steps, the adjustment value can be determined based on the amount and the direction (positive or negative) of the deviation of the actual detected value Tx' to the standard value Tx. Of course, the adjustment value increases in the positive side as the deviation amount increase in the positive side, while the adjustment value decrease in the negative side as the deviation amount decreases in the positive side. However, there are defined the upper and lower limit with respect to the deviation amount, so that the adjustment value is set to its upper or lower limit when the deviation amount exceeds its limit. After determining the adjusting value at step S126, the process advances to step S110. The adjustment value determined through the above processes is stored in a predetermined area in the RAM 3, and also stored in the auxiliary storage device 13 in accordance with the player's operation.

[0065] Incidentally, in the above process, only one object 45 is scrolled to determine the adjustment value, but it may possible to determine the adjustment value by repeating the same process. In this case, it is possible to determine a central value (for example, a mean, a mode, or a median), which can be obtained by processing the adjustment values corresponding to each object 45 through the statistical method, as a final adjusting value.

[0066] After finishing the process of FIG. 8, the picture 100 returns to the state shown in FIG. 9. If the player chooses the item of "TEST" in the choice item display portion 101 and then performs the determination operation, a test play shown in FIG. 13 is started. In the test play process, a plurality of objects 45 are displayed to be scrolled in one area 41 as shown in FIG. 15 likewise the actual game play, and the player is allowed to confirm whether or not the timing adjustment is properly carried out by operating the white key 21a in time with the scrolled objects 45.

[0067] After starting the process of FIG. 13, first of all, the performance sequence data to be used in the test play is read out from the CD-ROM 15 (step S201). The performance sequence data for the test play can be obtained by sampling the operation timings associated with the area 41 to be used in the test play. After reading out the performance sequence data, the adjusting value is read out from the RAM 13. Incidentally, in the case where the adjusting value stored in the auxiliary storage device 13 is used, it is necessary to send the adjustment value from the auxiliary storage device 13 to the predetermined are in the RAM 3 in advance.

[0068] At subsequent step S203, the play start process is executed. By the play start process, the reproduction of the BGM and the scroll process are started. At subsequent step S204, it is judged whether or not the operation of the player is detected, and if it is detected, the operation is evaluated by comparing the timing of the detected operation and the operating timing defined by the performance sequence data (for the test play) with each other. This evaluation process is already explained with referring FIG. 6(a). At next step S206, the result of the evaluation is displayed. In this case, letters corresponding to the evaluated level, that is, letters of the "GREAT", "GOOD", "BAD" or "POOR" shown in FIG. 6(a) are displayed to notify the player which level the operation is evaluated. Incidentally, FIG. 15 shows a display example when the operation is evaluated as "GREAT". After displaying the evaluation, it is judged whether or not the test play is to be terminated (step S207), and if it is judged as not to be terminated, the process returns to step S204. If the operation is not detected at step S204, steps S205 and S206 are skipped.

If it is judged that the test play is to be terminated at step S207, then the test play is terminated.

[0069] FIG. 14 shows a play start process to be executed as a sub-routine process of step S203. In the play start process, first of all, a delay time is set in accordance with the adjusting value (step S301). Next, the start of the reproduction of the BGM is instructed (step S302). Immediately after, the counting up of the delay time is started, and the advance of the process is suspended till the delay time elapses (step S303). Then, the scroll process is started when the delay time has just elapsed (step S304). After that, the play start process is terminated. Incidentally, the delay time increases or decreased in accordance with the adjusting value. As in the case of FIG. 5, when the adjusting value is 0, the delay time accords to the deviation amount between the times T1 and T2. Also, the delay time increases from the standard value as the adjusting value deviates toward the negative side, while decreases from the standard value as the adjusting value deviates toward the positive side. The scroll process is executed in parallel to the processes of steps S204 to S207 in FIG. 13, but the reference time of thereof is different from the reference time for the evaluation as described in the above.

[0070] FIG. 16 shows a process executed in the case where the game is actually played in the game machine constructed as described above. After starting a game process, initialization is performed at step S1, and then the process to let the player choose the stage (step S2). One stage is constituted by at least one tune. A plurality of stages is prepared, and tunes constituting each stage are different from each other. After the stage is chosen, data necessary for playing each tune constituting the stage are load into the RAM 3 (step S3), and then the play start process is executed at step S4. The detail of the play start process is the same as the procedures shown in FIG. 14. Incidentally, after starting the play, the clocking is started to specify the position in the tune with the proper position being as the reference (not shown in the figures). In the case of FIG.5, as a one example, the clocking is done with the reproduction stat time T0 of the BGM being as the reference point. The current position in the tune is detected by using the clocking, which has been started as is described above (step S5), and then it is judged whether or not the tune advances to a stage termination position (step S6). If it is judged as a negative, the process for detecting the operation of the played is performed (step S7), and then a sound generating process corresponding to the detected operation is done (step S8). If the operation is not detected, the sound generating is not performed.

[0071] At subsequent step S9, the player's operation is evaluated by comparing the detected result of the operation and the performance sequence data with each other. The way for the evaluation has already been explained with referring to FIG. 6(a). After that, the evaluation result is displayed (step S10), and then the process returns to step S5. If it is judged as the stage termination position at step S6, then the process advances to step S11 to thereby sum up evaluation results at the present stage, and the record according to the summed result is displayed (step s12). On the basis of the record, it is judged whether or not the stage is cleared (step S13), and if the stage is cleared, then it is judged whether or not all stages are finished (step S14). If a negative judgment is made at step S14, the process returns to step S2. If a negative judgment is made at step S13, or an affirmative judgment is made at step S14, an ending of the game is displayed at step S15, and then the game process is terminated. Incidentally, the scroll process which has been started in the play process at step S4 is performed in parallel to the steps S5 to S10 in FIG. 16, but the reference time thereof is different from the reference time for the evaluation as explained in the above.

[0072] In the above embodiment, the timing of instructing the operation through the scroll process (the timing of instructing the operation through the coincidence of the objects 45 and 46 and the reference line 36) is changed in accordance with the adjustment value, while the evaluation of the operation is performed with the reproduction start position of the BGM being as the reference. Accordingly, in the case where the player believes to operate the controller 12 so as to exactly follow the instructed operation timing, while the deviation of the detection timing is occurred due to the responsiveness of the controller 12 or the like to thereby cause the trouble that the player can not obtain the evaluation as he or her believes, it is possible for the player to adjust the operation instruction timing to solve or reduce his or her feeling of wrongness. However, such adjustment can be done by another method. For example, as shown in FIG. 6(b), it may be acceptable to correct the timing Td of detecting the operation in accordance with the adjustment value, and to compare the corrected time Tc and the operation timing Tr defined in the performance sequence data. FIG. 17 shows a process to be executed instead of steps S7 to 9 of FIG. 16 to perform such correction. Step S401 corresponds to step S7, step S402 corresponds to step S8, step S404 corresponds to step S9, respectively, and at step S403, the timing when detecting the operation Td is corrected to the timing Tc in accordance with the adjustment value. Herein, it is supposed that the correction amount of the timing Tc is 0 when the adjustment value is 0. Under such presupposition, if the player feels that the operation timing instructed through the scroll process and wishes to advance the timing, namely, in the case where the player feels it necessary to delay the operation from the timing when he or she believes suitable to obtain higher evaluation, it is appropriate to set the adjustment value at a positive number and the detection timing Tc may be corrected to be delayed from the standard time. In the reverse case, the detection timing Tc may be corrected to be advanced from the standard time.

[0073] In FIGS. 6 (a) and (b), there are symmetrically

provided the evaluation ranges before and after the operation timing Tr defined in the performance sequence data, however, it may be possible to set asymmetrically as shown in FIG. 6 (c) to thereby solve or reduce the feeling of wrongness.

[0074] Incidentally, the above explanations are scoped to the case of correcting inconsistency that the player intends to perform the operation to exactly follow the timing when the objects 45 and 46 coincide with the reference line 36 while the evaluation is not so high. However, even if the player performs the operation to follow the operation instruction timing and can obtain the evaluation, as he or she believes, there may be the deviation between the operation instruction timing itself and the beats of the BGM, so that the player may feel musical unpleasantness. In such case, besides the adjustment of the start time of the scroll process or the like, the reference time for the evaluation of the operation may be shifted from the reproduction start position of the BGM similarly in the case of the reference time for the scroll process.

[0075] The present invention is not limited to the game system in which the operation is instructed using the above described operation instruction picture 31, but can be carried out in various embodiments. For example, in the operation instruction picture 31, it is possible to fix the positions of the objects 45 and 46, while scrolling the reference line 36 to instruct the operation timing. The present invention can be applied to the system in which the display of the partition lines 40 and 42 is omitted, and the operation position is indicated by using the relationship between the objects 45 and 46 and the controller picture 32. On the contrary thereto, the display of the controller picture 31 may be omitted, while the operation position may be indicated by using the relationship between the partition lines 40 and 42 and the objects 45 and 46. Further, it may be possible to omit both the controller picture 32 and the partition lines 40 and 42, and to indicate which position on the controller 12 should be operated with referring only to the position of the objects 45 and 46 in the right-and-left direction.

[0076] The present invention is not limited to the music simulation game, but can be applied to various game system as far as the system satisfies the condition that the reference data defining the operation timing are prepared in advance, the operation timing is instructed to the player based on that data, and the timing when the operation is performed is detected to thereby evaluate the operation. The present invention is not limited to the household game machine, but can be applied to the arcade-type game machine.

Claims

1. A game system **characterized by** comprising:

a storage device (15) for storing a reference data defining timing (Tr) of at least one operation to be performed by a player on an input device (12) in association with an elapsed time from a predetermined position (T0) as a reference in a game;
an operation instruction device (16) for instructing the player operation timing based on the reference data;
an operation detection device (16) for detecting actual timing (Td) of an actual operation performed on the input device by the player;
an evaluation device (16) for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device (16) for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device (16) for changing the operation timing to be instructed by the operation instruction device based on the adjustment value with the predetermined position in the game being as a reference.

2. A game system **characterized by** comprising:

a storage device (15) for storing a reference data defining timing (Tr) of at least one operation to be performed by a player on an input device (12) in association with an elapsed time from a predetermined position (T0) as a reference in a game;
an operation instruction device (16) for instructing the player operation timing based on the reference data;
an operation detection device (16) for detecting actual timing (Td) of an actual operation performed on the input device by the player;
an evaluation device (16) for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device (16) for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device (16) for adjusting a deviation amount between the timing defined in the reference data and the actual timing detected by the operation detection device based on the adjustment value.

3. A game system **characterized by** comprising:

a storage device (15) for storing a reference data defining timing (Tr) of at least one operation to be performed by a player on an input device (12) in association with an elapsed time from a predetermined position (T0) as a reference in a game;
an operation instruction device (16) for instructing the player operation timing based on the reference data;
an operation detection device (16) for detecting actual timing (Td) of an actual operation performed on the input device by the player;
an evaluation device (16) for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device (16) for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device (16) for changing a relationship between a deviation amount of the actual timing detected by the operation detection device to the timing defined in the reference data and an evaluation result by the evaluation device based on the adjustment value.

4. A game system **characterized by** comprising:

a tune reproduction device (16) for reproducing a tune with a predetermined position (T0) in a game being as a reference;
a storage device (15) for storing a reference data defining timing (Tr) of at least one operation to be performed by a player on an input device (12) during a reproduction of the tune in association with a position in the tune to be reproduced in a game;
an operation instruction device (16) for instructing the player operation timing based on the reference data during the reproduction of the tune;
an operation detection device (16) for detecting actual timing (Td) of an actual operation performed on the input device by the player during the reproduction of the tune;
an evaluation device (16) for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device (16) for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device (16) for changing a deviation amount between the position in the tune and the operation timing to be instructed by the operation instruction device based on the adjustment value when the tune is reproduced.

5. A game system **characterized by** comprising:

a tune reproduction device (16) for reproducing a tune with a predetermined position (T0) in a game being as a reference;
a storage device (15) for storing a reference data defining timing (Tr) of at least one operation to be performed by a player on an input device (12) during a reproduction of the tune in association with a position in the tune to be reproduced in a game;
an operation instruction device (16) for instructing the player operation timing based on the reference data during the reproduction of the tune;
an operation detection device (16) for detecting actual timing (Td) of an actual operation performed on the input device by the player during the reproduction of the tune;
an evaluation device (16) for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device (16) for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device (16) for adjusting a deviation amount between the timing of the operation defined in the reference date and the actual timing detected by the operation detection device based on the adjustment value.

6. A game system **characterized by** comprising:

a tune reproduction device (16) for reproducing a tune with a predetermined position (T0) in a game being as a reference;
a storage device (15) for storing a reference data defining timing (Tr) of at least one operation to be performed by a player on an input device (12) during a reproduction of the tune in association with a position in the tune to be reproduced in a game;
an operation instruction device (16) for instruct-

ing the player operation timing based on the reference data during the reproduction of the tune;
an operation detection device (16) for detecting actual timing (Td) of an actual operation performed on the input device by the player during the reproduction of the tune;
an evaluation device (16) for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device (16) for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device (16) for changing a relationship between a deviation amount of the actual timing detected by the operation detection device to the timing defined in the reference data and an evaluation result by the evaluation device based on the adjustment value.

7. The game system according to any one of claims 1 to 6, wherein said adjusting value setting device (16) changes the adjustment value based on an amount of an operation by the player to a specific operation portion (23) in the input device (12).

8. The game system according to any one of claims 1 to 6, wherein the adjusting value setting device (16) causes the operation instruction device to instruct an operation at predetermined timing with said predetermined position being as a reference, and sets the adjusting value based on a deviation amount between said instructed timing of the operation and an actual timing detected by the operation detection device in response to that instruction.

9. The game system according to claim 4, wherein there is defined, in the reference data, timing of a series of operations to be performed on the input device by the player during the reproduction of the tune,

the operation instruction device (16) causes a display device (9) to display on a screen thereof instruction signs (45, 46) which correspond to said series of the operations, respectively, and a predetermined reference sign (36), and also moves at least one of each instruction sign and the reference sign in a predetermined direction on the screen at a speed corresponding to a tempo of the tune to thereby instruct the player respective timing of said series of the operations through a coincidence of said each instruction sign and the reference sing, and
the adjustment execution device changes, based on the adjustment value, the timing when said each instruction sign and the reference sign coincide with each other with said predetermined position being as the reference.

10. A computer readable storage medium (15) **characterized by** storing a program which causes a computer (16) provided in a game system to serve as:

an operation instruction device for instructing a player operation timing based on a reference data which defines timing (Tr) of at least one operation to be performed by the player on an input device (12) in association with an elapsed time from a predetermined position (T0) as a reference in a game;
an operation detection device for detecting actual timing (Td) of an actual operation performed on the input device by the player;
an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device for changing the operation timing to be instructed by the operation instruction device based on the adjustment value with the predetermined position in the game being as a reference.

11. A computer readable storage medium (15) **characterized by** storing a program which causes a computer (16) provided in a game system to serve as:

an operation instruction device for instructing a player operation timing based on a reference data which defines timing (Tr) of at least one operation to be performed by the player on an input device (12) in association with an elapsed time from a predetermined position (T0) as a reference in a game;
an operation detection device for detecting actual timing (Td) of an actual operation performed on the input device by the player;
an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device for making

the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device for adjusting a deviation amount between the timing defined in the reference data and the actual timing detected by the operation detection device based on the adjustment value.

12. A computer readable storage medium (15) **characterized by** storing a program which causes a computer (16) provided in a game system to serve as:

an operation instruction device for instructing a player operation timing based on a reference data which defines timing (Tr) of at least one operation to be performed by the player on an input device (12) in association with an elapsed time from a predetermined position (T0) as a reference in a game;
an operation detection device for detecting actual timing (Td) of an actual operation performed on the input device by the player;
an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device for changing a relationship between a deviation amount of the actual timing detected by the operation detection device to the timing defined in the reference data and an evaluation result by the evaluation device based on the adjustment value.

13. A computer readable storage medium (15) **characterized by** storing a program which causes a computer (16) provided in a game system to serve as:

a tune reproduction device for reproducing a tune with a predetermined position (T0) in a game being as a reference;
an operation instruction device for instructing a player operation timing during the reproduction of the tune based on a reference data which defines timing (Tr) of at least one operation to be performed by the player on an input device (12) during a reproduction of the tune in association with a position in the tune to be reproduced in the game;
an operation detection device for detecting actual timing (Td) of an actual operation performed on the input device by the player during the reproduction of the tune;
an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device for changing a deviation amount between the position in the tune and the operation timing to be instructed by the operation instruction device based on the adjustment value when the tune is reproduced.

14. A computer readable storage medium (15) **characterized by** storing a program which causes a computer (16) provided in a game system to serve as:

a tune reproduction device for reproducing a tune with a predetermined position (T0) in a game being as a reference;
an operation instruction device for instructing a player operation timing during the reproduction of the tune based on a reference data which defines timing (Tr) of at least one operation to be performed by the player on an input device (12) during a reproduction of the tune in association with a position in the tune to be reproduced in the game;
an operation detection device for detecting actual timing (Td) of an actual operation performed on the input device by the player during the reproduction of the tune;
an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device for adjusting a deviation amount between the timing of the operation defined in the reference date and the actual timing detected by the operation detection device based on the adjustment value.

15. A computer readable storage medium (15) **characterized by** storing a program which causes a computer (16) provided in a game system to serve as:

a tune reproduction device for reproducing a tune with a predetermined position (T0) in a game being as a reference;
an operation instruction device for instructing a player operation timing during the reproduction of the tune based on a reference data which defines timing (Tr) of at least one operation to be performed by the player on an input device (12) during a reproduction of the tune in association with a position in the tune to be reproduced in the game;
an operation detection device for detecting actual timing (Td) of an actual operation performed on the input device by the player during the reproduction of the tune;
an evaluation device for evaluating the actual operation detected by the operation detection device by comparing the timing of the operation defined in the reference data and the detected actual timing with each other;
an adjustment value setting device for making the player perform a predetermined adjustment value setting operation and for setting an adjustment value to correct an evaluation result based on a result of execution of the adjustment value setting operation; and
an adjustment execution device for changing a relationship between a deviation amount of the actual timing detected by the operation detection device to the timing defined in the reference data and an evaluation result by the evaluation device based on the adjustment value.

16. The computer readable storage medium according to any one of claims 10 to 15, wherein said adjusting value setting device (16) changes the adjustment value based on an amount of an operation by the player to a specific operation portion (23) in the input device (12).

17. The computer readable storage medium according to any one of claims 10 to 15, wherein the adjusting value setting device (16) causes the operation instruction device to instruct an operation at predetermined timing with said predetermined position being as a reference, and sets the adjusting value based on a deviation amount between said instructed timing of the operation and an actual timing detected by the operation detection device in response to that instruction.

18. The computer readable storage medium according to claim 13, wherein there is defined, in the reference data, timing of a series of operations to be performed on the input device by the player during the reproduction of the tune,

the operation instruction device (16) causes a display device (9) to display on a screen thereof instruction signs (45, 46) which correspond to said series of the operations, respectively, and a predetermined reference sign (36), and also moves at least one of each instruction sign and the reference sign in a predetermined direction on the screen at a speed corresponding to a tempo of the tune to thereby instruct the player respective timing of said series of the operations through a coincidence of said each instruction sign and the reference sing, and
the adjustment execution device changes, based on the adjustment value, the timing when said each instruction sign and the reference sign coincide with each other with said predetermined position being as the reference.

FIG. 1

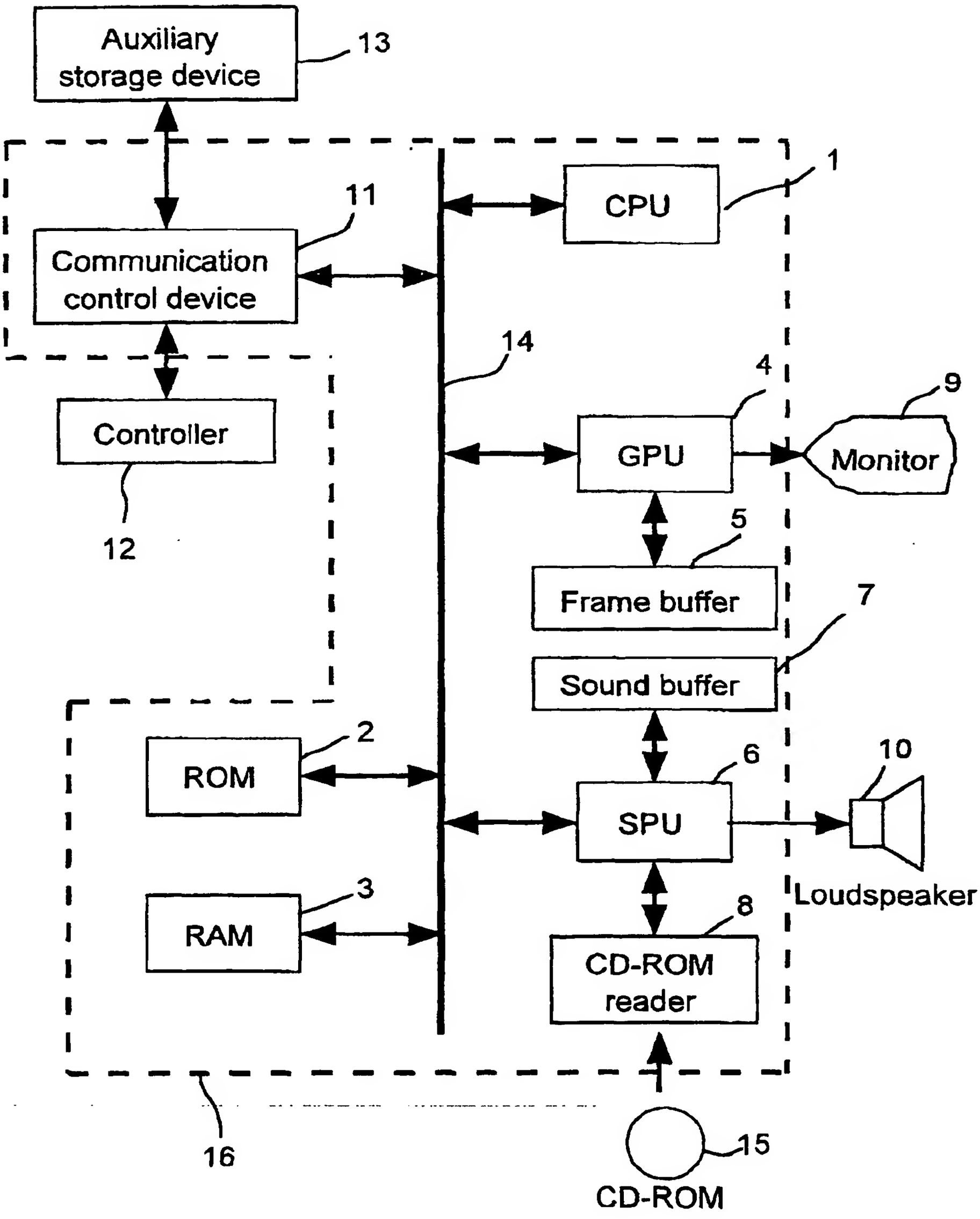

Auxiliary storage device
13
1
CPU
11
Communication control device
14
4
9
GPU
Monitor
Controller
5
12
Frame buffer
7
Sound buffer
2
6
10
ROM
SPU
3
8
RAM
CD-ROM reader
Loudspeaker
16
15
CD-ROM

FIG. 2

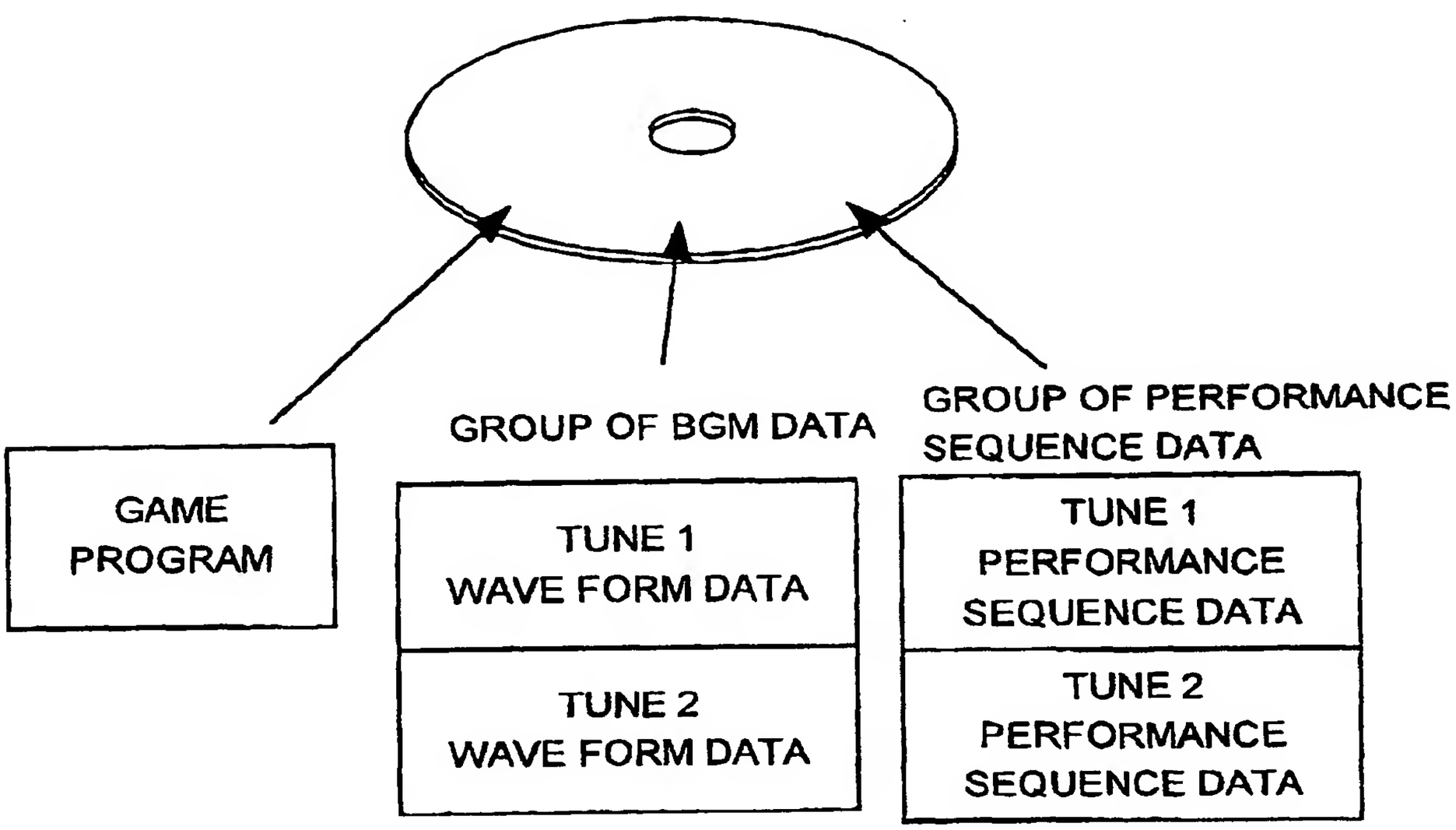

GAME PROGRAM
GROUP OF BGM DATA
TUNE 1 WAVE FORM DATA
TUNE 2 WAVE FORM DATA
GROUP OF PERFORMANCE SEQUENCE DATA
TUNE 1 PERFORMANCE SEQUENCE DATA
TUNE 2 PERFORMANCE SEQUENCE DATA

FIG.3

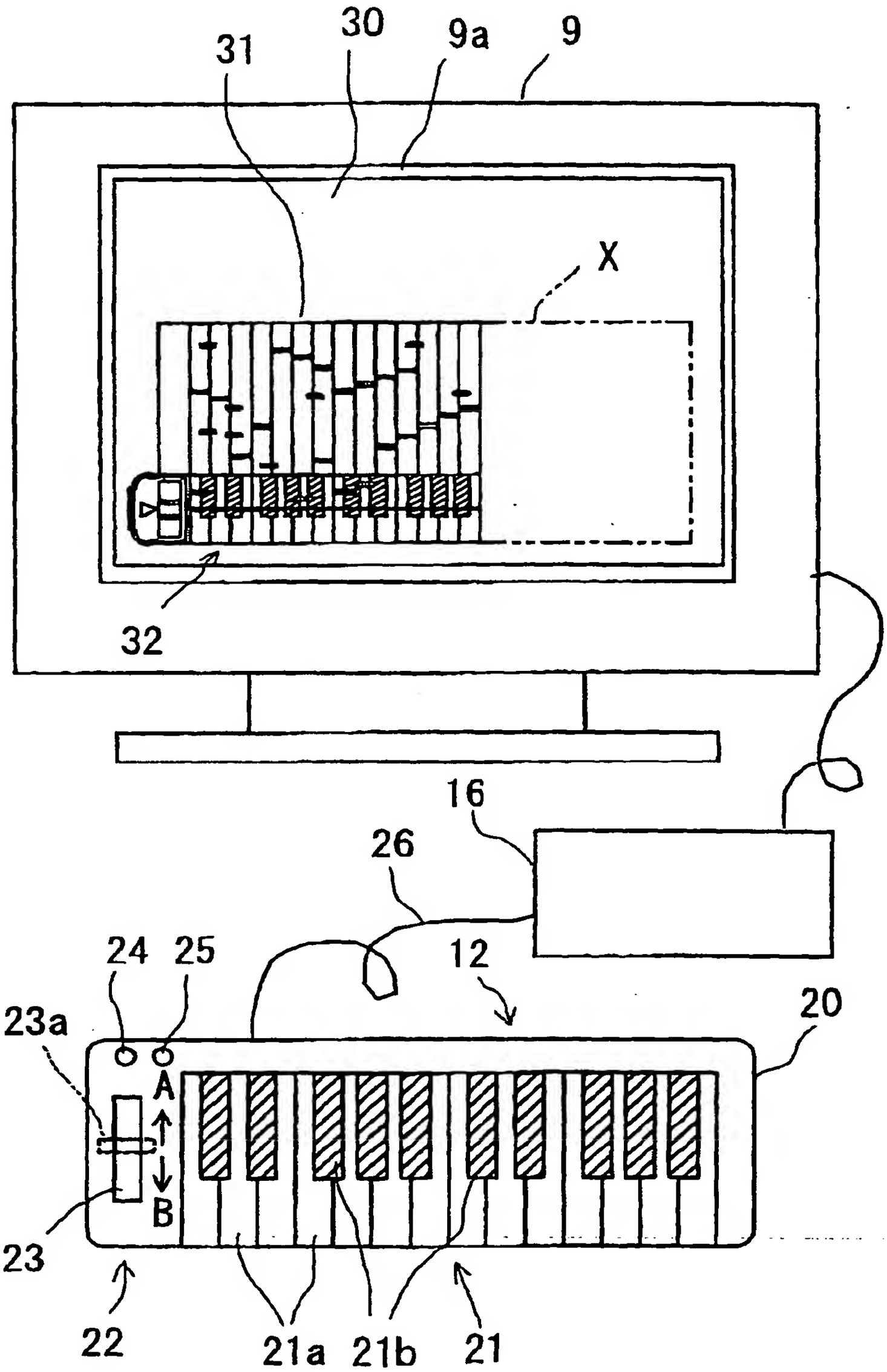


FIG.4

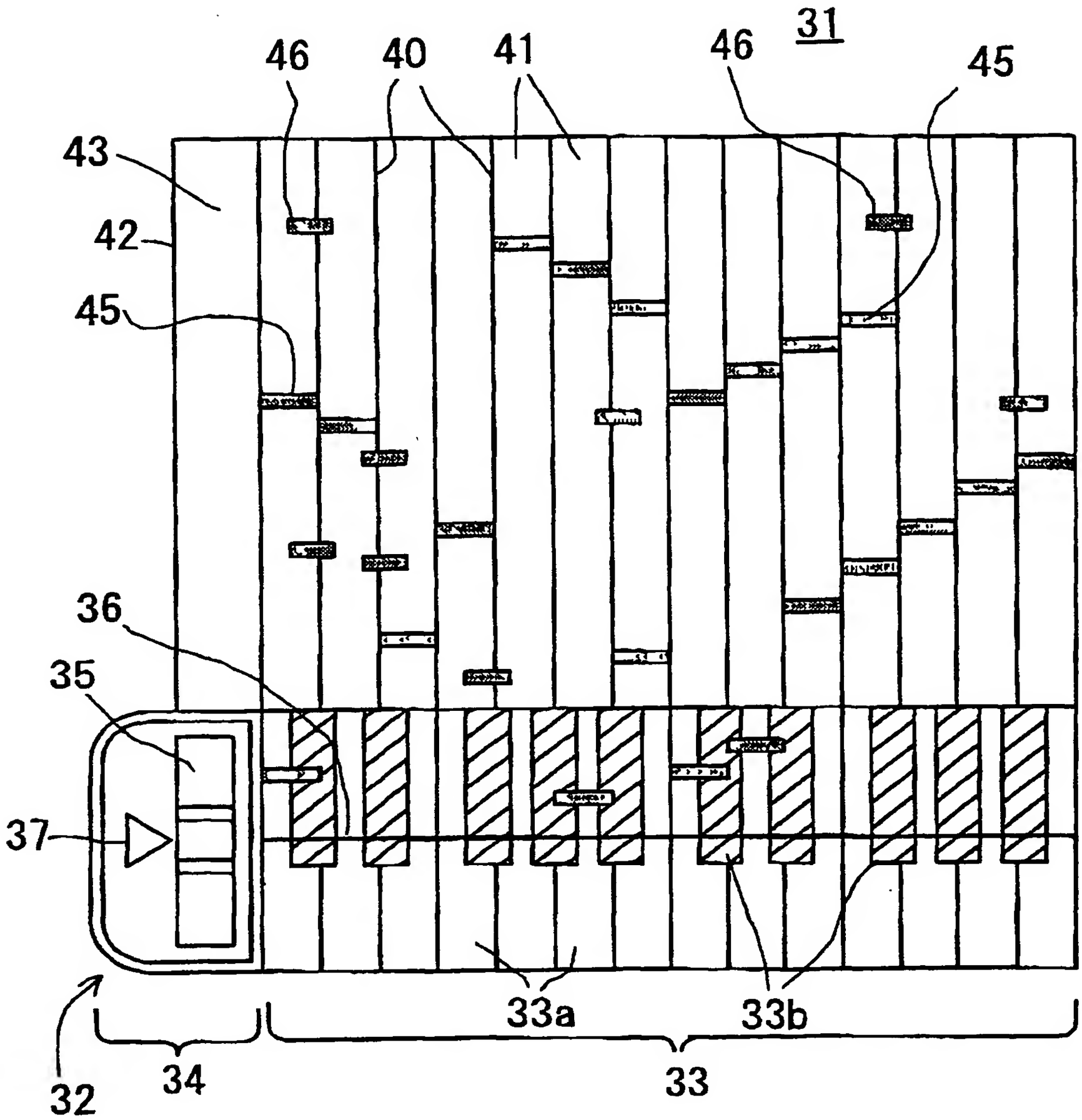


FIG. 5

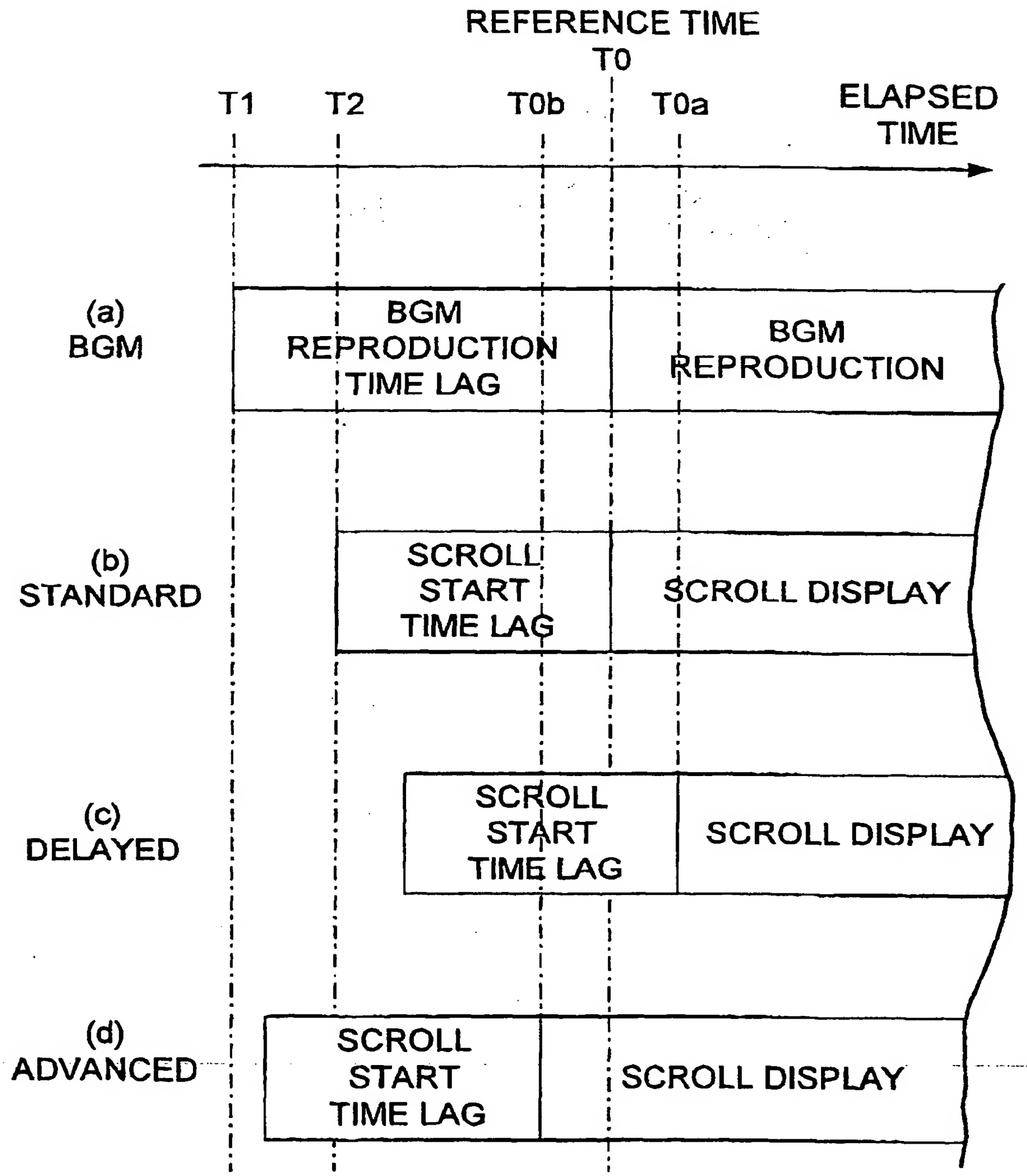

REFERENCE TIME
T0
T1
T2
T0b
T0a
ELAPSED TIME
(a) BGM
BGM REPRODUCTION TIME LAG
BGM REPRODUCTION
(b) STANDARD
SCROLL START TIME LAG
SCROLL DISPLAY
(c) DELAYED
SCROLL START TIME LAG
SCROLL DISPLAY
(d) ADVANCED
SCROLL START TIME LAG
SCROLL DISPLAY

FIG. 6

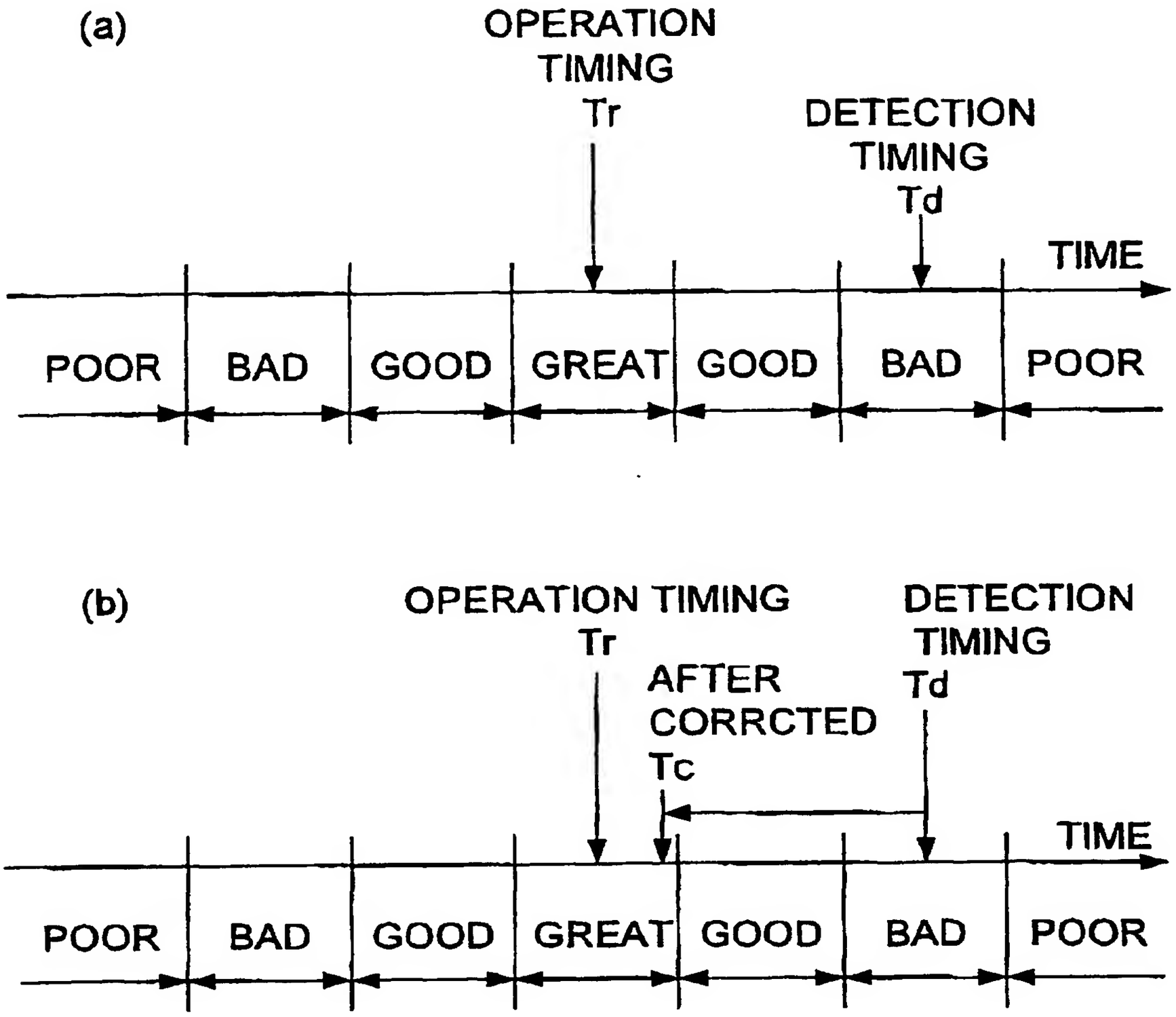

(a)
OPERATION TIMING Tr
DETECTION TIMING Td
TIME
POOR
BAD
GOOD
GREAT
GOOD
BAD
POOR
(b)
OPERATION TIMING Tr
AFTER CORRCTED Tc
DETECTION TIMING Td
TIME
POOR
BAD
GOOD
GREAT
GOOD
BAD
POOR
(c)
OPERATION TIMING Tr
DETECTION TIMING Td
TIME
POOR
BAD
GOOD
GREAT
GOOD
BAD
POOR

FIG. 7

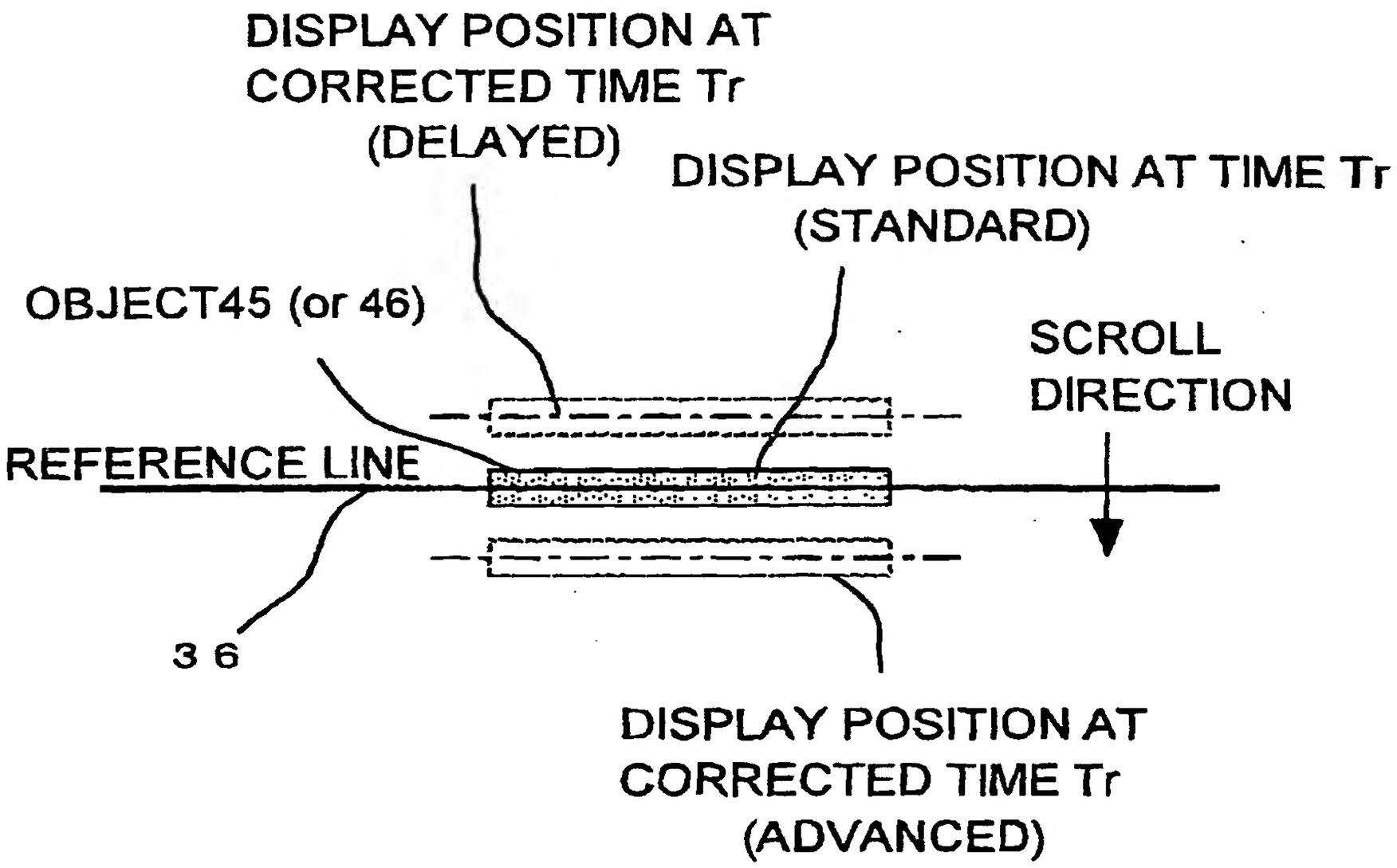

DISPLAY POSITION AT
CORRECTED TIME Tr
(DELAYED)
DISPLAY POSITION AT TIME Tr
(STANDARD)
OBJECT45 (or 46)
SCROLL
DIRECTION
REFERENCE LINE
3 6
DISPLAY POSITION AT
CORRECTED TIME Tr
(ADVANCED)

FIG. 8

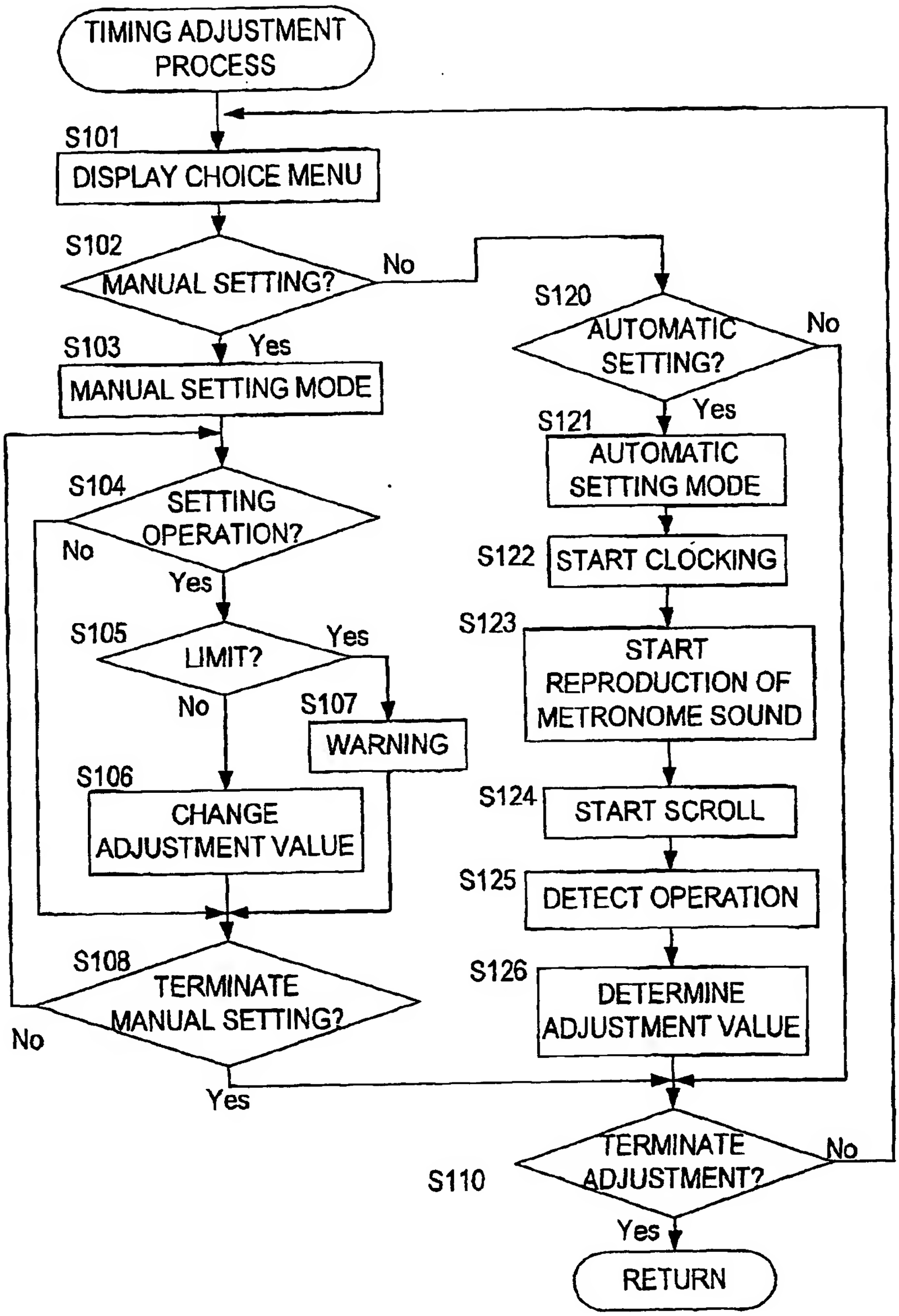

TIMING ADJUSTMENT PROCESS
S101
DISPLAY CHOICE MENU
S102
MANUAL SETTING?
No
Yes
S103
MANUAL SETTING MODE
S104
SETTING OPERATION?
No
Yes
S105
LIMIT?
Yes
No
S107
WARNING
S106
CHANGE ADJUSTMENT VALUE
S108
TERMINATE MANUAL SETTING?
No
Yes
S120
AUTOMATIC SETTING?
No
Yes
S121
AUTOMATIC SETTING MODE
S122
START CLOCKING
S123
START REPRODUCTION OF METRONOME SOUND
S124
START SCROLL
S125
DETECT OPERATION
S126
DETERMINE ADJUSTMENT VALUE
S110
TERMINATE ADJUSTMENT?
No
Yes
RETURN

FIG. 9

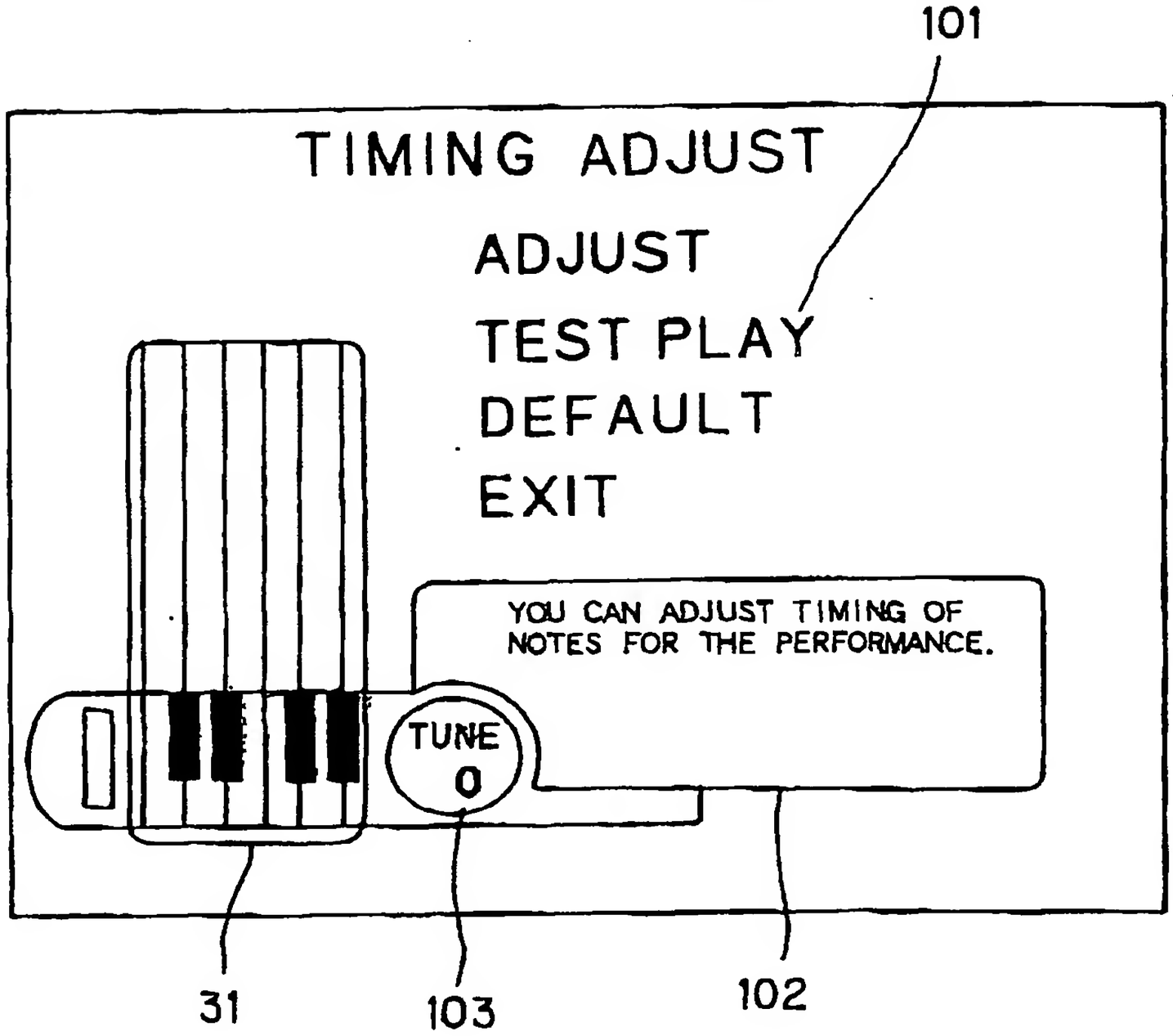

100
101
TIMING ADJUST
ADJUST
TEST PLAY
DEFAULT
EXIT
YOU CAN ADJUST TIMING OF NOTES FOR THE PERFORMANCE.
TUNE
0
31
103
102

FIG. 10

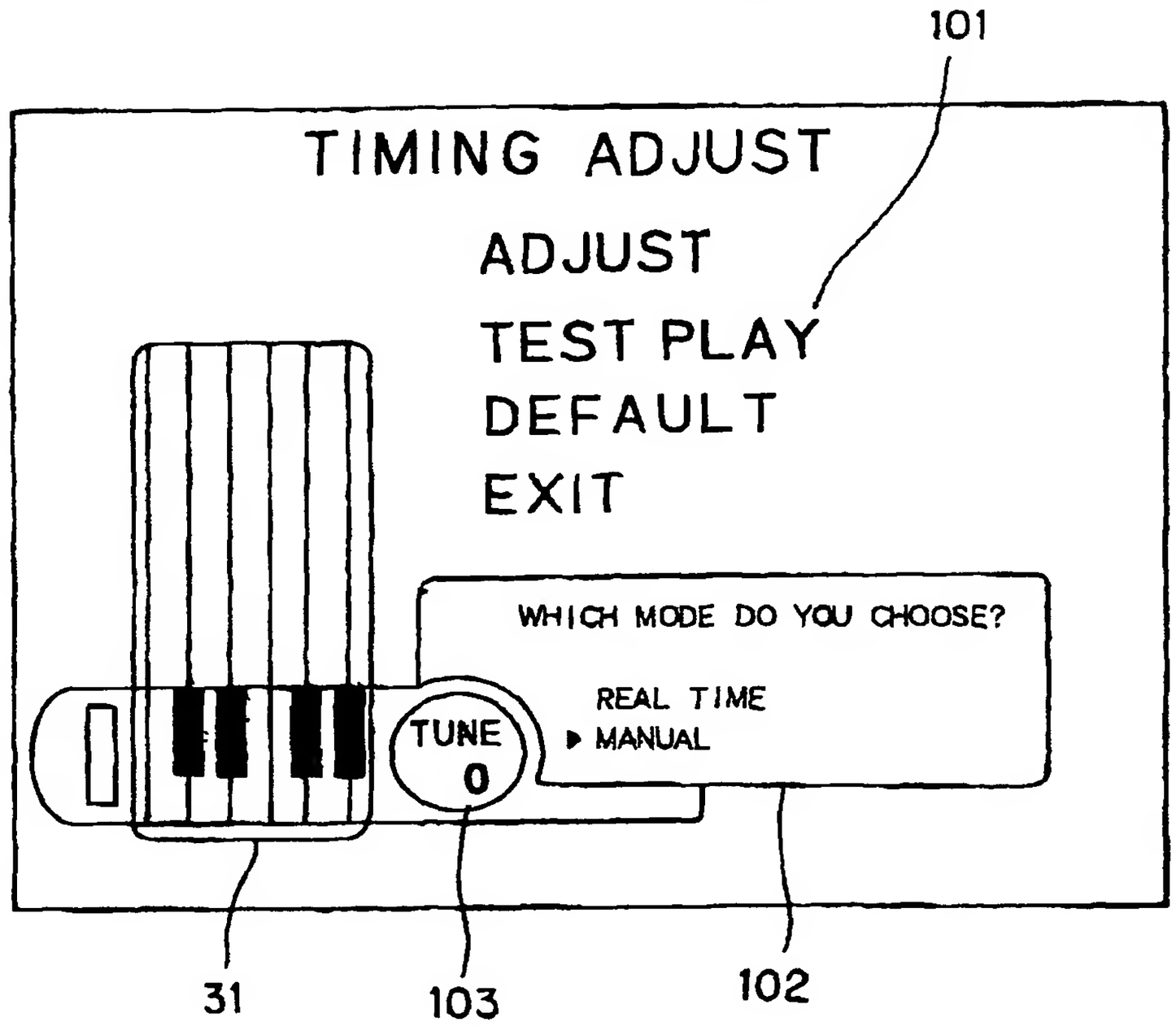

100
101
TIMING ADJUST
ADJUST
TEST PLAY
DEFAULT
EXIT
WHICH MODE DO YOU CHOOSE?
REAL TIME
▶ MANUAL
TUNE
0
31
103
102

FIG. 11

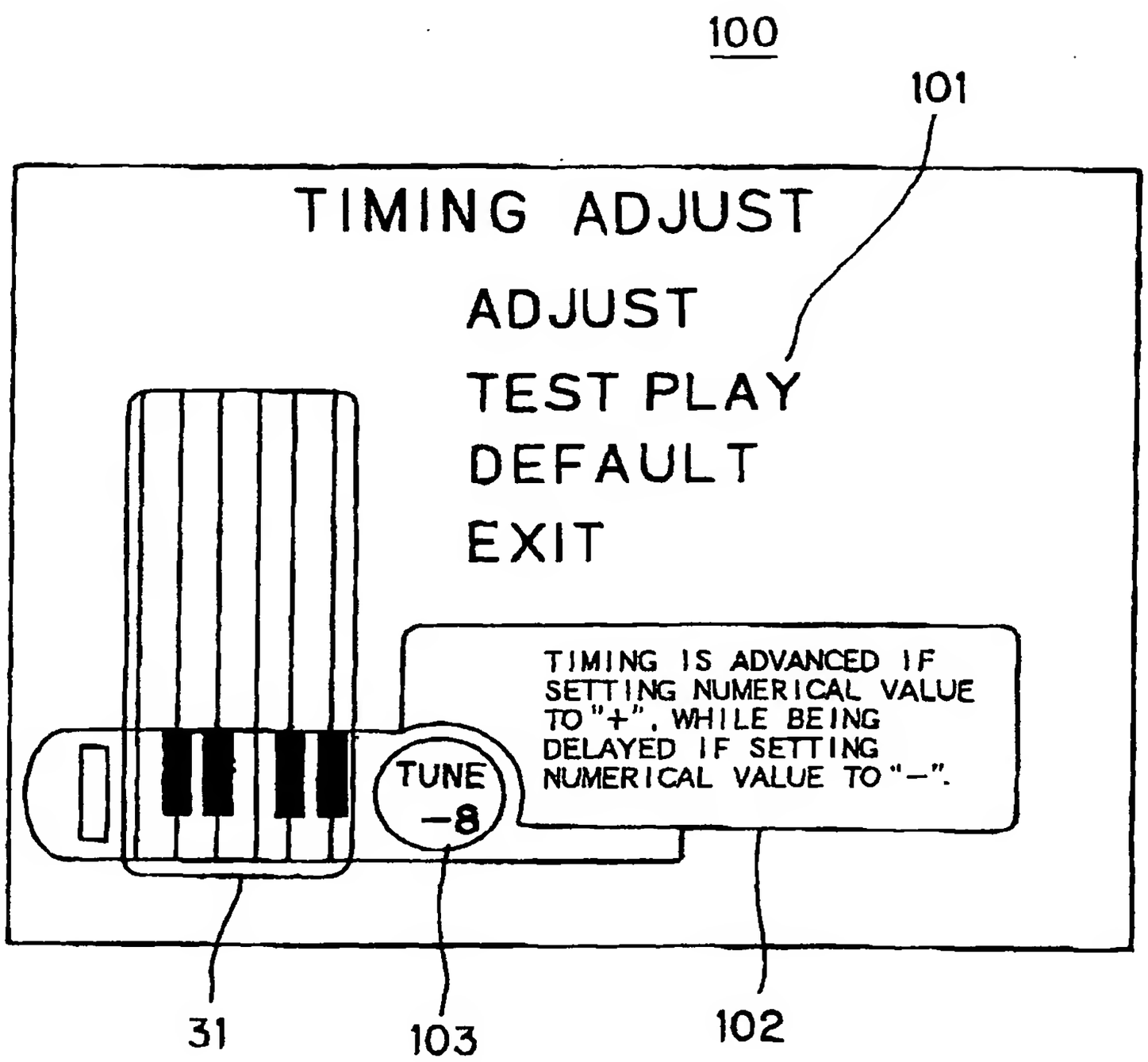

100
101
TIMING ADJUST
ADJUST
TEST PLAY
DEFAULT
EXIT
TIMING IS ADVANCED IF SETTING NUMERICAL VALUE TO "+", WHILE BEING DELAYED IF SETTING NUMERICAL VALUE TO "−".
TUNE
−8
31
103
102

FIG. 12

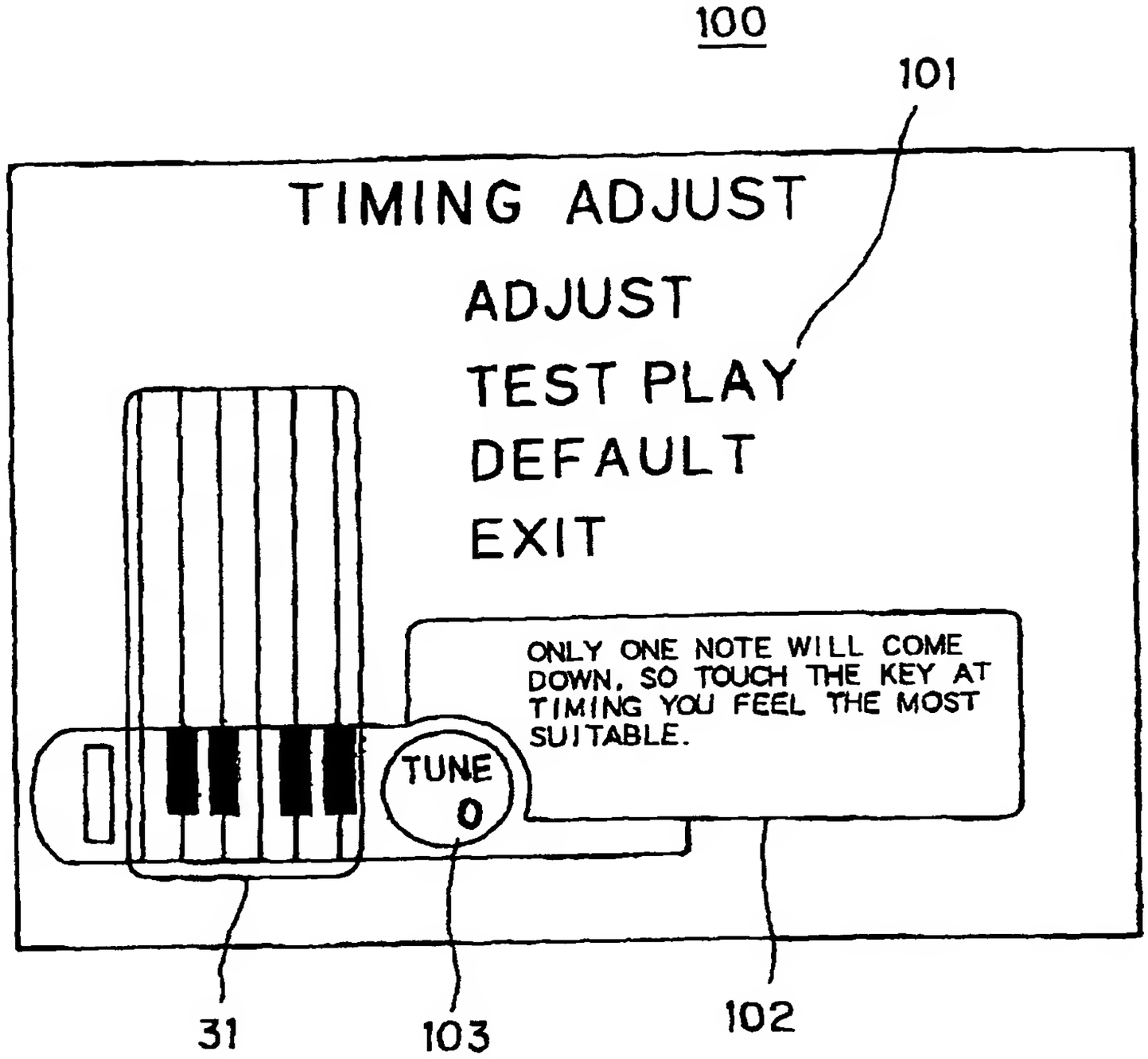

100
101
TIMING ADJUST
ADJUST
TEST PLAY
DEFAULT
EXIT
ONLY ONE NOTE WILL COME DOWN, SO TOUCH THE KEY AT TIMING YOU FEEL THE MOST SUITABLE.
TUNE
0
31
103
102

FIG. 13

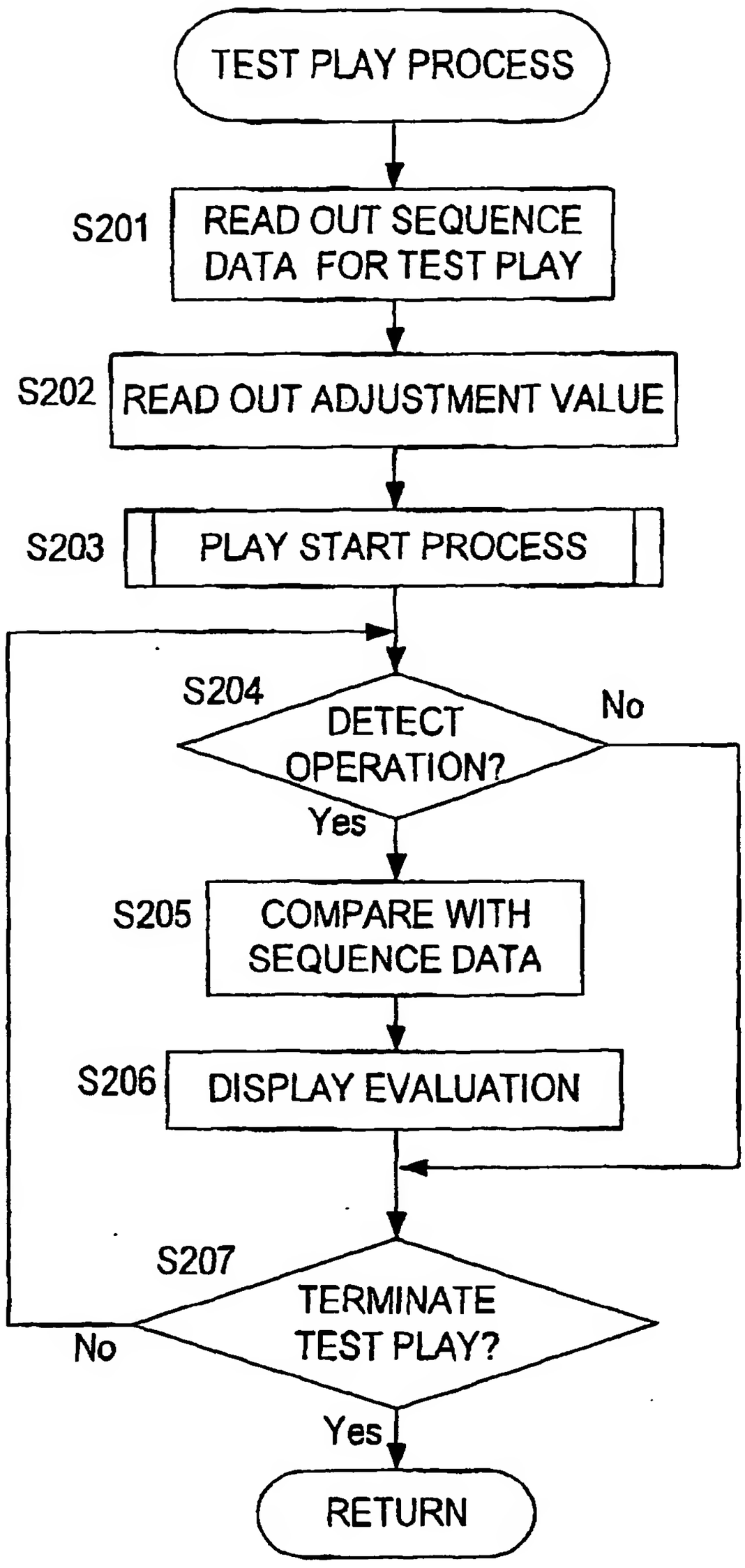

TEST PLAY PROCESS
S201
READ OUT SEQUENCE DATA FOR TEST PLAY
S202
READ OUT ADJUSTMENT VALUE
S203
PLAY START PROCESS
S204
DETECT OPERATION?
No
Yes
S205
COMPARE WITH SEQUENCE DATA
S206
DISPLAY EVALUATION
S207
TERMINATE TEST PLAY?
No
Yes
RETURN

FIG. 14

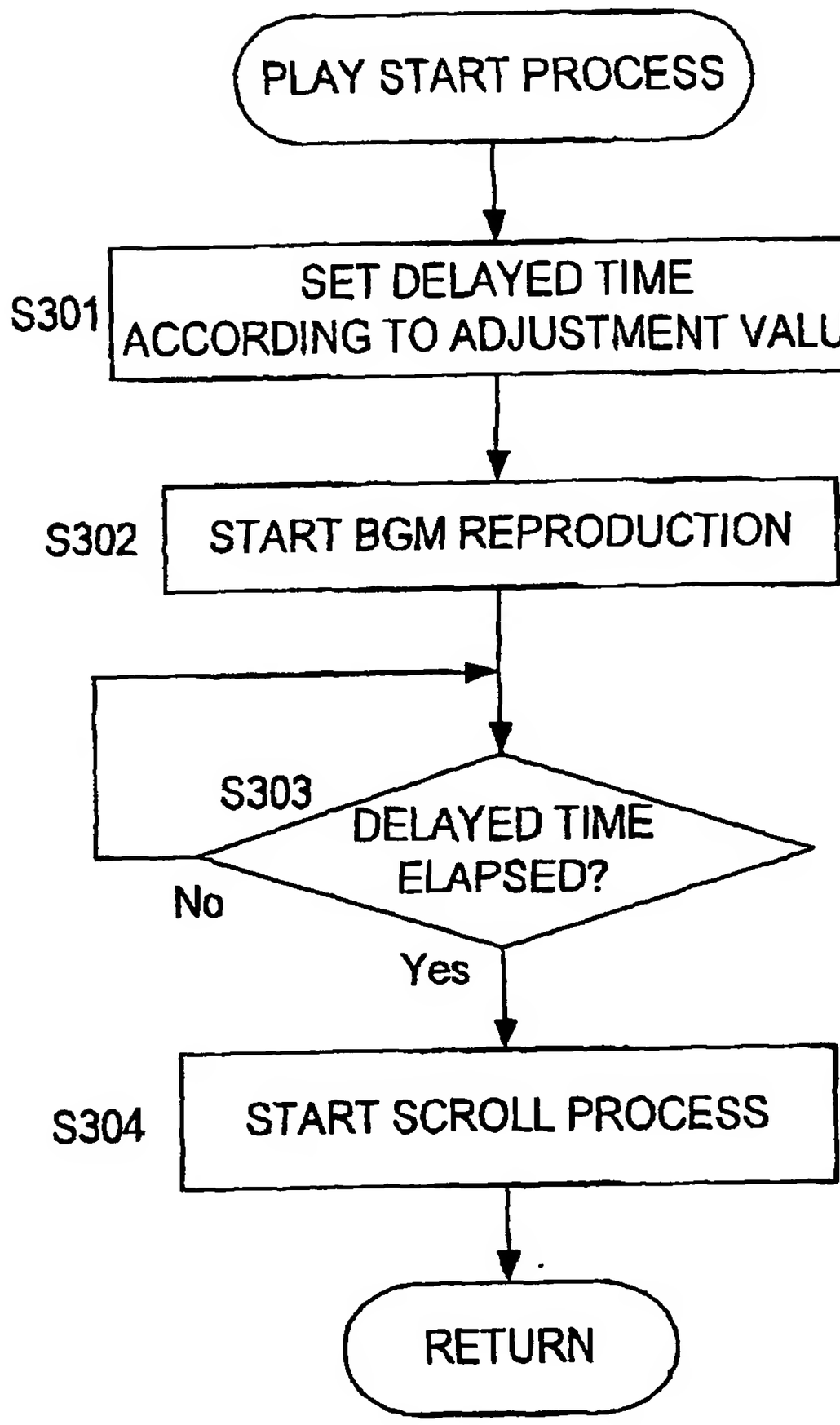

PLAY START PROCESS
S301
SET DELAYED TIME ACCORDING TO ADJUSTMENT VALUE
S302
START BGM REPRODUCTION
S303
DELAYED TIME ELAPSED?
No
Yes
S304
START SCROLL PROCESS
RETURN

FIG. 15

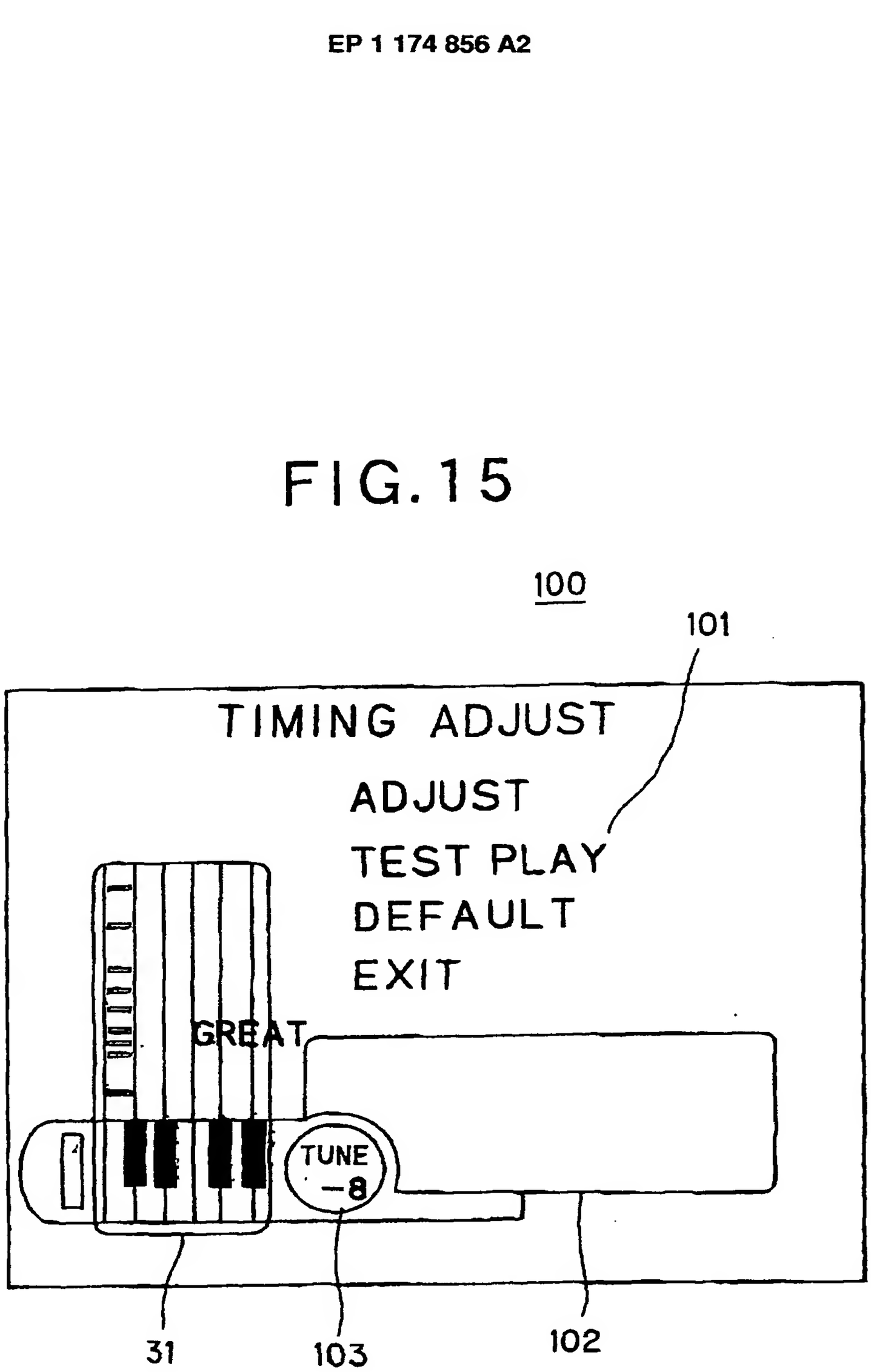

100
101
TIMING ADJUST
ADJUST
TEST PLAY
DEFAULT
EXIT
GREAT
TUNE
-8
31
103
102

FIG. 16

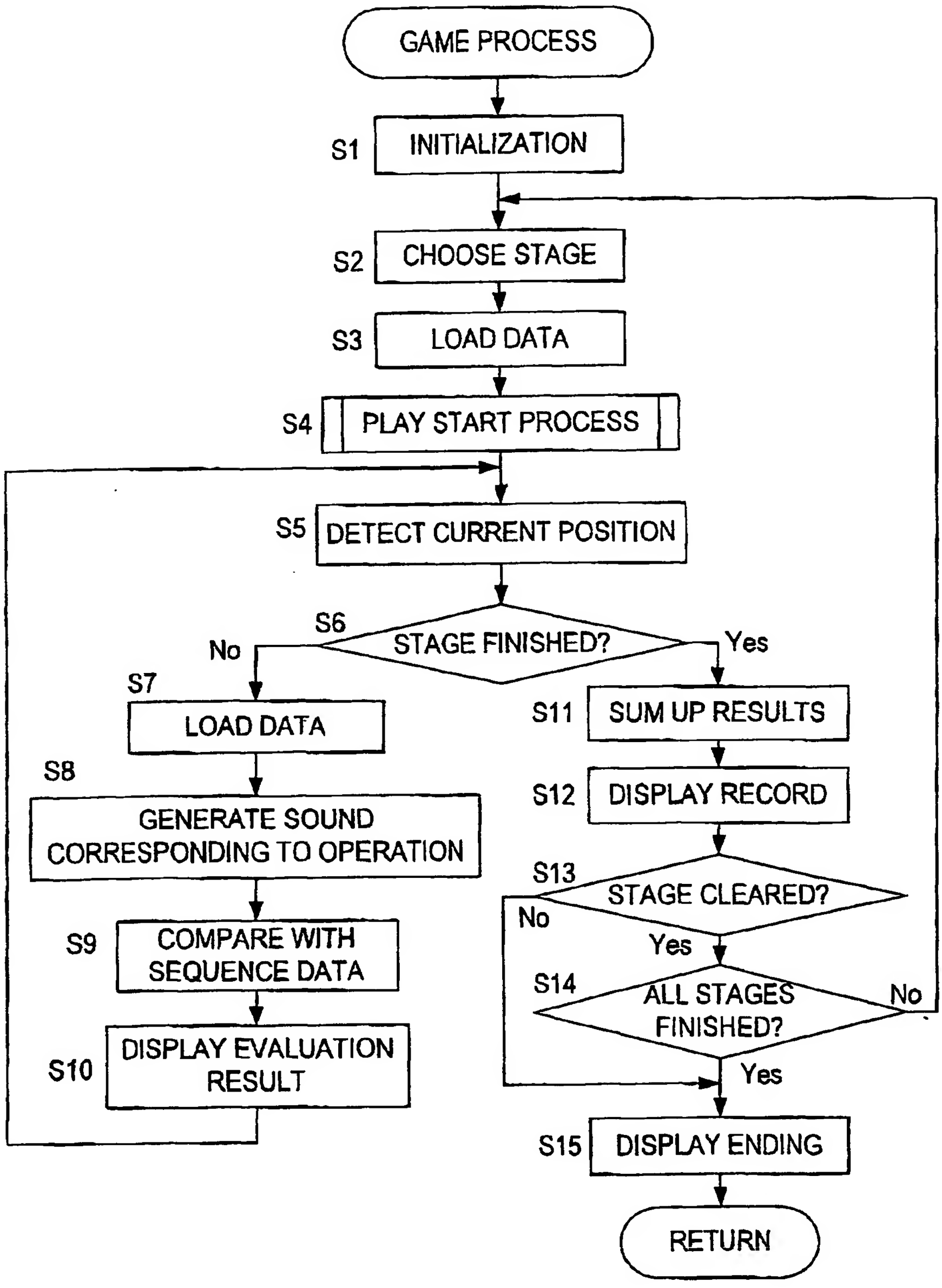
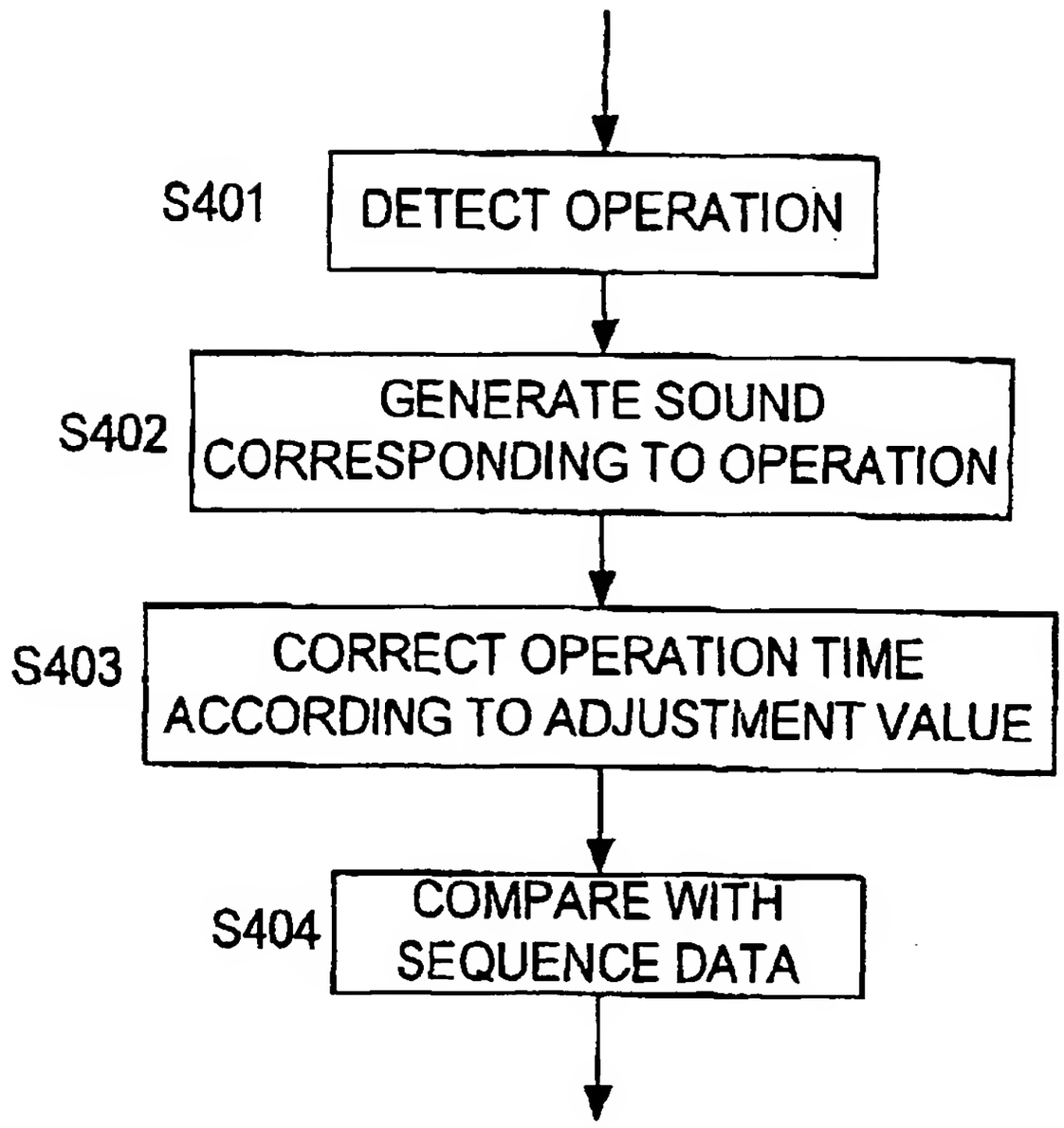

GAME PROCESS
S1
INITIALIZATION
S2
CHOOSE STAGE
S3
LOAD DATA
S4
PLAY START PROCESS
S5
DETECT CURRENT POSITION
S6
STAGE FINISHED?
No
Yes
S7
LOAD DATA
S8
GENERATE SOUND CORRESPONDING TO OPERATION
S9
COMPARE WITH SEQUENCE DATA
S10
DISPLAY EVALUATION RESULT
S11
SUM UP RESULTS
S12
DISPLAY RECORD
S13
STAGE CLEARED?
No
Yes
S14
ALL STAGES FINISHED?
No
Yes
S15
DISPLAY ENDING
RETURN

FIG. 17


S401
DETECT OPERATION
S402
GENERATE SOUND CORRESPONDING TO OPERATION
S403
CORRECT OPERATION TIME ACCORDING TO ADJUSTMENT VALUE
S404
COMPARE WITH SEQUENCE DATA

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